TRANE

Product Catalog

Air-Cooled Series R™ Chillers
Model RTAC
120 to 400 nominal tons (50 Hz)



January 2015

RLC-PRC039B-EN

Ingersoll Rand

Introduction

Like its chillers, Trane wants its relationships with customers to last. Trane is interested in maintaining long term, loyal relationships. This perspective means the point in time that a customer purchases a chiller is the beginning of a relationship, not the end. Your business is important, but your satisfaction is paramount.

The RTAC offers high reliability coupled with proven Series R performance.

The Series R Model RTAC is an industrial grade design built for both the industrial and commercial markets. It is ideal for schools, hospitals, retailers, office buildings, Internet service providers and manufacturing facilities.

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Revision History

RLC-PRC039B-EN (15 Jan 2015)

The following points describe the changes to this revision on the manual:

- Updated electrical data and customer wiring information
- Rapid Restart Test
- Add seismic isolator option
- Added optional tarp information

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Features and Benefits

World Class Energy Efficiency

The importance of energy efficiency cannot be understated. Fortunately, ASHRAE has created a guideline emphasizing its importance. Nonetheless, energy is often dismissed as an operational cost over which the owner has little control. That perception results in missed opportunities for energy efficiency, reduced utility bills, and higher profits. Lower utility bills directly affect profitability. Every dollar saved in energy goes directly to the bottom line. Trane's RTAC is one way to maximize your profits.

ASHRAE Standard 90.1 and Executive Order

All Trane air-cooled chillers meet the new efficiency levels mandated by ASHRAE Standard 90.1. This new standard requires higher efficiencies than past technologies can deliver. The US Federal Government has adopted standard 90.1 and, in some cases, requires even higher efficiencies. Federal Executive Order mandates energy consuming devices procured must be in the top 25% of their class. In the case of chillers, that product standard is ASHRAE 90.1. Trane's RTAC meets and exceeds the efficiency requirements of 90.1, while the high and extra efficiency RTAC can meet the "stretch goals" of Executive Order.

Precise Capacity Control

Trane's patented unloading system allows the compressor to modulate infinitely and exactly match building loads. At the same time chilled water temperatures will be maintained within +/- 1/2ºF (0.28°C) of setpoint. Screw or scroll chillers with stepped capacity control do well to maintain chilled water temperatures within 2ºF (1.1°C) of setpoint. Stepped control also results in over cooling because rarely does the capacity of the machine match the building load. The result can be 10% higher energy bills. Trane's RTAC optimizes the part load performance of your machine for energy efficiency, precise control for process applications, and your personal comfort regardless of the weather outside.

Excellent Reliability

A buildings environment is expected to be comfortable. When it is, no one says a word. If it's not… that's a different story. The same is true with chillers. No one ever talks about chillers, yet alone compressors, until they fail, and tenants are uncomfortable and productivity is lost. Trane's helical rotary compressors have been designed and built to stay running when you need them.

Fewer moving parts

Trane's helical rotary compressors have only two major rotating parts: the male and female rotor. A reciprocating compressor can have more than 15 times that number of critical parts. Multiples of pistons, valves, crankshafts, and connecting rods in a reciprocating unit all represent different failure paths for the compressor. In fact, reciprocating compressors can easily have a failure rate four times of a helical rotor. Combine that with two to three reciprocating compressors for each helical rotary compressor on chillers of equal tonnage, and statistics tell you it's a matter of time before you lose a reciprocating compressor.

Robust components

Helical rotary compressors are precisely machined using state of the art processes from solid metal bar stock. Tolerances are maintained within a micron or less than a tenth of the diameter of a human hair. The resulting compressor is a robust yet highly sophisticated assembly capable of ingesting liquid refrigerant without risk of damage.

Condenser coils

Trane's condenser coils are manufactured with the same philosophy as the compressors; they're built to last. Even though manufacturing processes have allowed thinner and thinner materials in their assembly, with obvious material and manufacturing savings, Trane's coil material did not change with the RTAC generation of air cooled chillers. Substantial condenser fins, that do not require additional coating in non-corrosive environments, contribute to the highest reliability standards for air-cooled chillers in the industry.

Superior Control

The Adaptive Control™ microprocessor system enhances the air-cooled Series R chiller by providing the very latest chiller control technology. With the Adaptive Control microprocessor, unnecessary service calls and unhappy tenants are avoided. The unit is designed not to trip or unnecessarily shut down. Only when the Tracer™ chiller controllers have exhausted all possible corrective actions and the unit is still violating an operating limit will the chiller shut down. Controls on other equipment typically shut down the chiller, usually just when it is needed the most.

For example: A typical five year old chiller with dirty coils might trip out on high pressure cutout on a 100°F (38°C) day in August. A hot day is just when comfort cooling is needed the most. In contrast, the air-cooled Series R chiller with an Adaptive Control microprocessor will stage fans on, modulate electronic expansion valves, and modulate slide valve positions as the chiller approaches a high pressure cutout, thereby keeping the chiller online when you need it the most.

Simple Installation

- **Factory Installed Flow Switch.** Installed in the optimum location in the piping for reduced chiller installation cost and superior flow sensing, reducing the potential for nuisance trips.
- **Close Spacing Installation**. The air-cooled Series R™ Chiller has the tightest recommended side clearance in the industry, four feet for maximum performance. In situations where equipment must be installed with less clearance than recommended, which frequently occurs in retrofit applications, restricted airflow is common. Conventional chillers may not work at all. However, the air-cooled Series R chiller with Adaptive Control™ microprocessor will make as much chilled water as possible given the actual installed conditions, stay on line during unforeseen abnormal conditions, and optimize the unit performance. Consult your Trane sales engineer for more details.
- **Factory Testing Means Trouble Free Startup**. All air-cooled Series R chillers are given a complete functional test at the factory. This computer based test program completely checks the sensors, wiring, electrical components, microprocessor function, communication capability, expansion valve performance and fans. In addition, each compressor is run and tested to verify capacity and efficiency. Where applicable, each unit is factory preset to the customer's design conditions; an example would be leaving liquid temperature setpoint. The result of this test program is that the chiller arrives at the job site fully tested and ready for operation.
- **Factory Installed and Tested Controls/Options Speed Installation**. All Series R chiller options, including main power supply disconnect, low ambient control, ambient temperature sensor, low ambient lockout, communication interface and ice making controls, are factory installed and tested. Some manufacturers send accessories in pieces to be field installed. With Trane, the customer saves on installation expense and has assurance that ALL chiller controls/options have been tested and will function as intended.

Unit Performance Testing

The AHRI Certification Program has had a certification program covering air-cooled water chillers for many years. With this in mind, customers may ask, "Do I need to factory performance test my chiller?"

Trane began promoting factory performance tests for water-cooled water chillers in 1984 for the same reasons it is valid today for air-cooled water chillers, to show we stand behind the products we design and build.

The benefits of a performance test include verification of performance, prevention of operational problems, and assurance of a smooth startup. Only a performance test conducted in a laboratory or laboratory grade facility will confirm both performance and operation of a specific chiller.

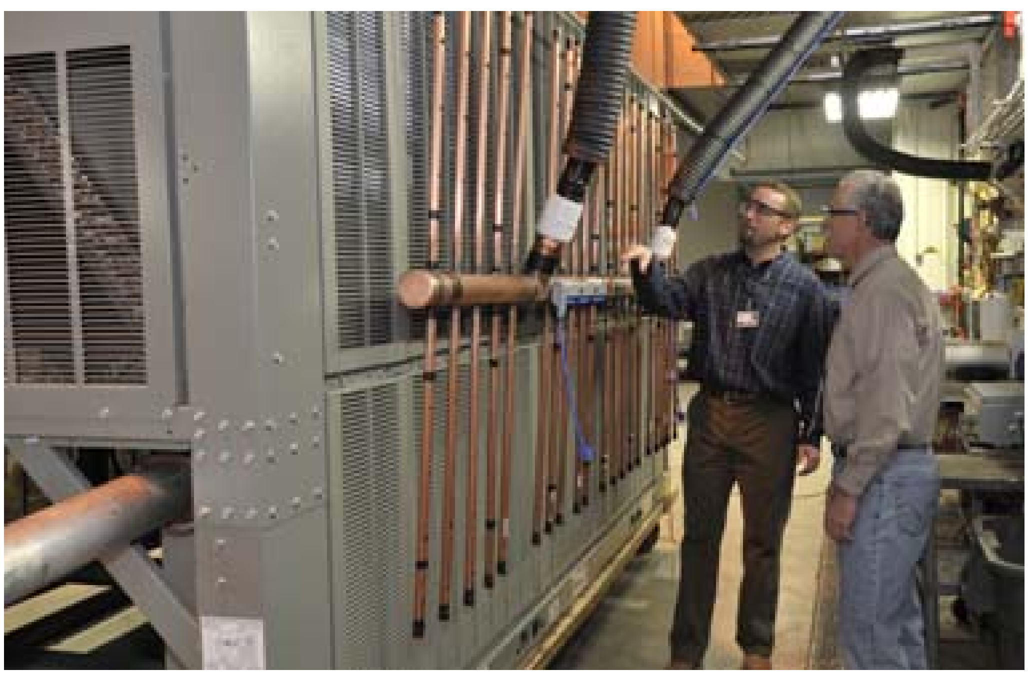
While most factory performance tests go smoothly, should problems occur, Trane personnel can quickly correct them and the chiller will ship as specified. Job site diagnosis, ordering of parts, and waiting for delivery of replacement components is significantly reduced.

A factory performance test reduces startup time, thereby saving job site expense. A chiller that has been tested is operation and performance proven. This allows the installing contractor to concentrate on proper electrical wiring and water piping, and the service technicians to concentrate on proper refrigerant charge, safeties diagnosis and initial logging of the chiller. Means of obtaining full load on the chiller and proving its performance do not have to be determined by engineers or contractors, thus saving time. The certified test report documents performance for the unit as built. In addition, factory testing significantly reduces commissioning time and risk by reintroducing manufacturer responsibility, where its mitigation should reside.

When a factory performance test is requested, the test can be conducted at the specified design conditions for all packaged chillers. The test facility has the capability to control ambient test conditions to assure our customers that our chillers will perform as predicted.

Rapid Restart™ testing is also available to demonstrate the chiller's rapid restart capabilities for disaster relief. While the chiller is operating at customer specified full load conditions, power to the chiller is cut and the customer can witness how quickly the chiller will return to full load.

For more information on test performance testing, see brochure RL-SLB012-EN.



Application Considerations

Important

Certain application constraints should be considered when sizing, selecting and installing Trane air-cooled Series R chillers. Unit and system reliability is often dependent upon proper and complete compliance with these considerations. When the application varies from the guidelines presented, it should be reviewed with your local Trane sales engineer.

Unit Sizing

Unit capacities are listed in the performance data section. Intentionally over sizing a unit to assure adequate capacity is not recommended. Erratic system operation and excessive compressor cycling are often a direct result of an oversized chiller. In addition, an oversized unit is usually more expensive to purchase, install, and operate. If over sizing is desired, consider using multiple units.

Water Treatment

Dirt, scale, products of corrosion and other foreign material will adversely affect heat transfer between the water and system components. Foreign matter in the chilled water system can also increase pressure drop and consequently, reduce water flow. Proper water treatment must be determined locally, depending on the type of system and local water characteristics. Neither salt nor brackish water is recommended for use in Trane air-cooled Series R chillers. Use of either will lead to a shortened life to an indeterminable degree. The Trane Company encourages the employment of a reputable water treatment specialist, familiar with local water conditions, to assist in this determination and in the establishment of a proper water treatment program.

Effect Of Altitude On Capacity

Air-cooled Series R chiller capacities given in the performance data tables are for use at sea level. At elevations substantially above sea level, the decreased air density will reduce condenser capacity and, therefore, unit capacity and efficiency.

Ambient Limitations

Trane air-cooled Series R chillers are designed for year round operation over a range of ambient temperatures. The Model RTAC chiller will operate as standard in ambient temperatures of 25°F to 115°F (-4°C to 46°C). With the low ambient option, these units will operate down to 0°F (-18°C). If an ambient temperature as high as 125°F (51°C) is the basis for design, the high ambient option will permit the chiller to run without going into a limiting condition. For installations in areas with large ambient differences, the wide ambient option will allow the chiller to perform uninhibited from 0°F to 125°F (-18°C to 51°C).

Water Flow Limits

The minimum and maximum water flow rates are given in the General Data tables. Evaporator flow rates below the tabulated values will result in laminar flow causing freeze up problems, scaling, stratification and poor control. Flow rates exceeding those listed may result in excessive tube erosion.

Note: *Flow rates in General Data tables are for water only. They do not include glycol.*

Leaving Water Temperature Limits

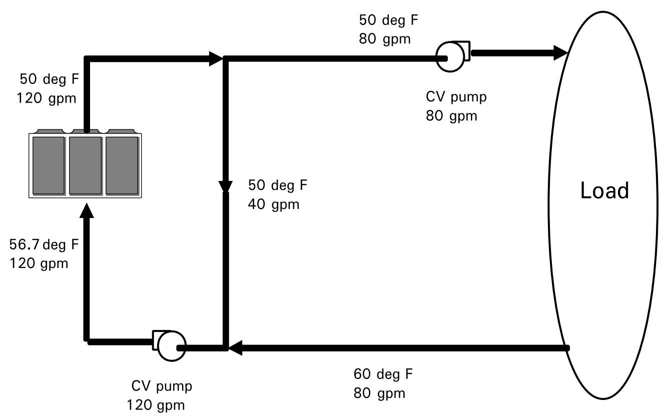
Trane air-cooled Series R chillers have three distinct leaving water categories: standard, low temperature, and ice making. The standard leaving solution temperature range is 40 to 65°F (4.4 to 15.6°C). Low temperature machines produce leaving liquid temperatures less than 40°F (4.4°C). Since liquid supply temperature setpoints less than 40°F (4.4°C) result in suction temperatures at or below the freezing point of water, a glycol solution is required for all low temperature machines. Ice making machines have a leaving liquid temperature range of 20 to 60°F (-6.7 to 15.6°C). Ice making controls include dual setpoint controls and safeties for ice making and standard cooling capabilities. Consult your local Trane sales engineer for applications or selections involving low

temperature or ice making machines. The maximum water temperature that can be circulated through an evaporator when the unit is not operating is 108°F (42°C).

Flow Rates Out of Range

Many process cooling jobs require flow rates that cannot be met with the minimum and maximum published values for the Model RTAC evaporator. A simple piping change can alleviate this problem. For example: A plastic injection molding process requires 80 gpm (5.1 l/s) of 50°F (10°C) water and returns that water at 60°F (15.6°C). The selected chiller can operate at these temperatures, but has a minimum flow rate of 120 gpm (7.6 l/s). The system layout in Figure A1 can satisfy the process.

Figure 1. Flow rate out of range system layout



Flow Control

Trane requires the chilled water flow control in conjunction with the Air-Cooled Series R Chiller to be done by the chiller. This will allow the chiller to protect itself in potentially harmful conditions.

Supply Water Temperature Drop

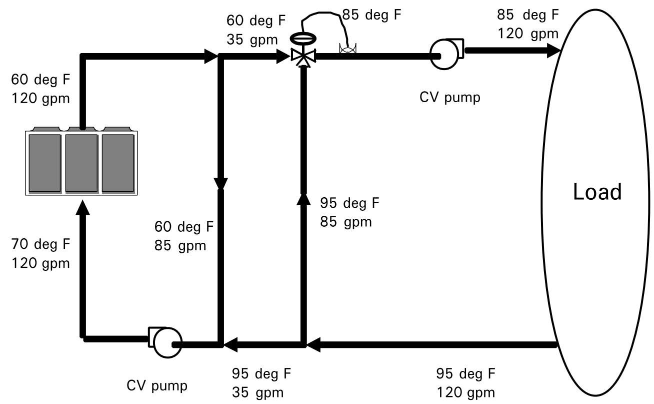
The performance data for the Trane air-cooled Series R chiller is based on a chilled water temperature drop of 10°F (5.6°C). Chilled water temperature drops from 6 to 18°F (3.3 to 10°C) may be used as long as minimum and maximum water temperatures and flow rates are not violated. Temperature drops outside this range are beyond the optimum range for control and may adversely affect the microcomputer's ability to maintain an acceptable supply water temperature range. Further, temperature drops of less than 6°F (3.3°C) may result in inadequate refrigerant superheat. Sufficient superheat is always a primary concern in any refrigerant system and is especially important in a package chiller where the evaporator is closely coupled to the compressor. When temperature drops are less than 6°F (3.3°C), an evaporator runaround loop may be required.

Leaving Water Temperature Out of Range

Many process cooling jobs require temperature ranges that cannot be met with the minimum and maximum published values for the Model RTAC evaporator. A simple piping change can alleviate this problem. For example: A laboratory load requires 120 gpm (7.6 l/s) of water entering the process at 85°F (29.4°C) and returning at 95°F (35°C). The accuracy required is better than the cooling tower can give. The selected chiller has adequate capacity, but a maximum leaving chilled water temperature of 60°F (15.6°C).

In Figure A2, both the chiller and process flow rates are equal. This is not necessary. For example, if the chiller had a higher flow rate, there would simply be more water bypassing and mixing with warm water.

Figure 2. Temperature out of range system layout



Variable Flow in the Evaporator

An attractive chilled water system option may be a variable primary flow (VPF) system. VPF systems present building owners with several cost saving benefits that are directly related to the pumps. The most obvious cost savings result from eliminating the secondary distribution pump, which in turn avoids the expense incurred with the associated piping connections (material, labor), electrical service, and variable frequency drive. Building owners often cite pump related energy savings as the reason that prompted them to install a VPF system.

The evaporator on the Model RTAC can withstand up to 50 percent water flow reduction as long as this flow is equal to or above the minimum flow rate requirements. The microprocessor and capacity control algorithms are designed to handle a maximum of 10% change in water flow rate per minute in order to maintain ± 0.5°F (0.28°C) leaving evaporator temperature control. For applications in which system energy savings is most important and tight temperature control is classified as +/- 2°F (1.1°C), up to 30 percent changes in flow per minute are possible.

With the help of a software analysis tool such as System Analyzer™ , DOE-2 or TRACE™ , you can determine whether the anticipated energy savings justify the use of variable primary flow in a particular application. It may also be easier to apply variable primary flow in an existing chilled water plant. Unlike the "decoupled" system design, the bypass can be positioned at various points in the chilled water loop and an additional pump is unnecessary.

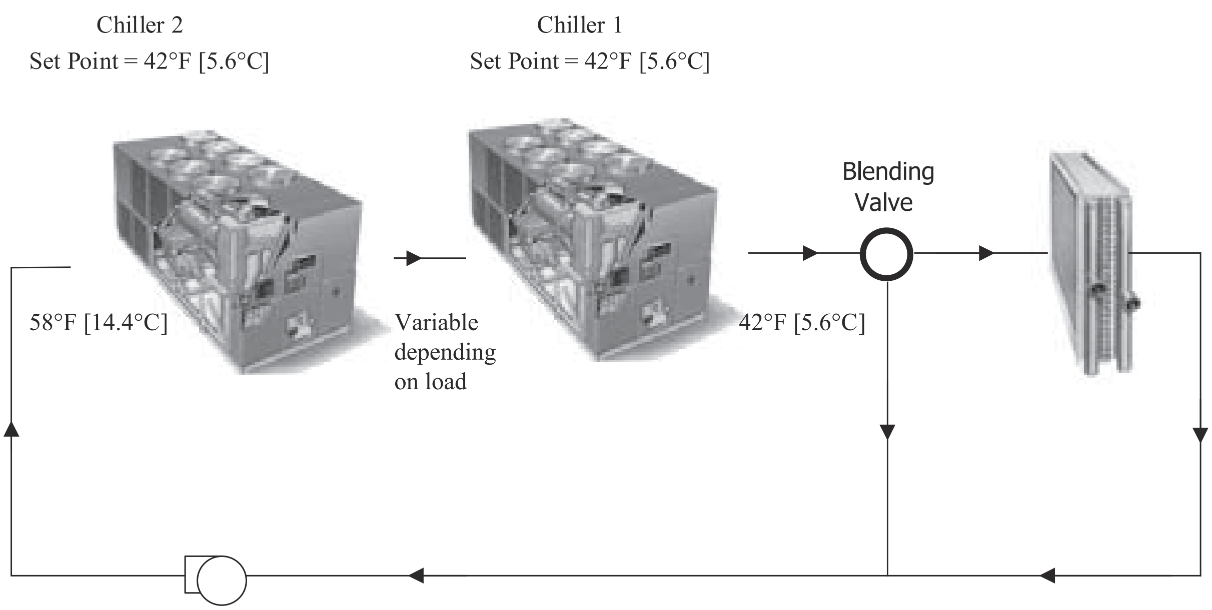
Series Chiller Arrangements

Another energy saving strategy is to design the system around chillers arranged in series. The actual savings possible with such strategies depends on the application dynamics and should be researched by consulting your Trane Systems Solutions Representative and applying an analysis tool from the Trace software family. It is possible to operate a pair of chillers more efficiently in a series chiller arrangement than in a parallel arrangement. It is also possible to achieve higher entering to leaving chiller differentials, which may, in turn, provide the opportunity for lower chilled water design temperature, lower design flow, and resulting installation and operational cost savings. The Trane screw compressor also has excellent capabilities for “lift,” which affords an opportunity for “lift,” which affords an opportunity for savings on the evaporator water loop.

Series chiller arrangements can be controlled in several ways. Figure A3 shows a strategy where each chiller is trying to achieve the system design set point. If the cooling load is less than 50 percent of the systems capabilities, either chiller can fulfill the demand. As system loads increase, the Chiller 2 becomes preferentially loaded as it attempts to meet the leaving chilled water setpoint. Chiller 1 will finish cooling the leaving water from Chiller 2 down to the system design setpoint.

Staggering the chiller set points is another control technique that works well for preferentially loading Chiller 1. If the cooling load is less than 50 percent of the system capacity, Chiller 1 would be able to satisfy the entire call for cooling. As system loads increase, Chiller 2 is started to meet any portion of the load that Chiller 1 can not meet.

Figure 3. Typical series chiller arrangement



Typical Water Piping

All building water piping must be flushed prior to making the final connections to the chiller. To reduce heat loss and prevent condensation, insulation should be installed. Expansion tanks are also usually required so that chilled water volume changes can be accommodated.

Short Water Loops

The proper location of the temperature control sensor is in the supply (outlet) water connection or pipe. This location allows the building to act as a buffer and assures a slowly changing return water temperature. If there is not a sufficient volume of water in the system to provide an adequate buffer, temperature control can be lost, resulting in erratic system operation and excessive compressor cycling. A short water loop has the same effect as attempting to control from the building return water. Typically, a two minute water loop is sufficient to prevent problems. Therefore, as a guideline, ensure the volume of water in the evaporator loop equals or exceeds two times the evaporator flow rate in gallons per minute. For a rapidly changing load profile, the amount of volume should be increased. To prevent the effect of a short water loop, the following items should be given careful consideration: A storage tank or larger header pipe to increase the volume of water in the system and, therefore, reduce the rate of change of the return water temperature.

Applications Types

- Comfort cooling.
- Industrial process cooling.
- Ice/thermal storage.
- Low temperature process cooling.

Typical Unit Installation

Outdoor HVAC equipment must be located to minimize noise and vibration transmission to the occupied spaces of the building structure it serves. If the equipment must be located in close proximity to a building, it could be placed next to an unoccupied space such as a storage room, mechanical room, etc. It is not recommended to locate the equipment near occupied, sound sensitive areas of the building or near windows. Locating the equipment away from structures will also prevent sound reflection, which can increase levels at property lines, or other sensitive points.

When physically isolating the unit from structures, it is a good idea to not use rigid supports, and to eliminate any metal-to-metal or hard material contact, when possible. This includes replacing spring or metal weave isolation with elastomeric isolators. Figure A4 illustrates isolation recommendations for the RTAC.

For chiller sound ratings, installation tips and considerations on chiller location, pipe isolation, etc., refer to the Trane Air-Cooled Series R Chillers Sound Data and Application Guide for Noise Sensitive Installations.

System Options - Ice Storage

Trane air-cooled Series R Chillers are well suited for ice production. An air-cooled machine typically switches to ice production at night. Two things happen under this assumption. First, the leaving brine temperature from the evaporator is lowered to around 22 to 24°F (-5.5 to -4.4°C). Second, the ambient temperature has typically dropped about 15 to 20°F (8.3 to 11°C) from the peak daytime ambient. This effectively places a lift on the compressors that is similar to daytime running conditions. The chiller can operate in lower ambient at night and successfully produce ice to supplement the next day's cooling demands.

The Model RTAC produces ice by supplying ice storage tanks with a constant supply of glycol solution. Air-cooled chillers selected for these lower leaving fluid temperatures are also selected for efficient production of chilled fluid at nominal comfort cooling conditions. The ability of Trane chillers to serve “double duty” in ice production and comfort cooling greatly reduces the capital cost of ice storage systems.

When cooling is required, ice chilled glycol is pumped from the ice storage tanks directly to the cooling coils. No expensive heat exchanger is required. The glycol loop is a sealed system, eliminating expensive annual chemical treatment costs. The air-cooled chiller is also available for comfort cooling duty at nominal cooling conditions and efficiencies. The modular concept of glycol ice storage systems and the proven simplicity of Trane Tracer controllers allow the successful blend of reliability and energy saving performance in any ice storage application.

The ice storage system is operated in six different modes: each optimized for the utility cost of the hour.

1. Provide comfort cooling with chiller
2. Provide comfort cooling with ice
3. Provide comfort cooling with ice and chiller
4. Freeze ice storage
5. Freeze ice storage when comfort cooling is required
6. Off

Tracer optimization software controls operation of the required equipment and accessories to easily transition from one mode of operation to another. For example:

Even with ice storage systems there are numerous hours when ice is neither produced or consumed, but saved. In this mode the chiller is the sole source of cooling. For example, to cool the building after all ice is produced but before high electrical demand charges take effect, Tracer sets the air-cooled chiller leaving fluid setpoint to its most efficient setting and starts the chiller, chiller pump, and load pump.

When electrical demand is high, the ice pump is started and the chiller is either demand limited or shut down completely. Tracer controls have the intelligence to optimally balance the contribution of ice and chiller in meeting the cooling load.

The capacity of the chiller plant is extended by operating the chiller and ice in tandem. Tracer rations the ice, augmenting chiller capacity while reducing cooling costs. When ice is produced, Tracer will lower the air-cooled chiller leaving fluid setpoint and start the chiller, ice and chiller pumps, and other accessories. Any incidental loads that persist while producing ice can be addressed by starting the load pump and drawing spent cooling fluid from the ice storage tanks.

For specific information on ice storage applications, contact your local Trane sales office.

Model Number Descriptions

Digits 1, 2 - Unit Model
RT = Rotary chiller

Digit 3 - Unit Type
A = Air-cooled

Digit 4 - Development Sequence
C = Development sequence

Digits 5, 6 & 7 - Nominal Capacity
120 = 120 Nominal tons
130 = 130 Nominal tons
140 = 140 Nominal tons
155 = 155 Nominal tons
170 = 170 Nominal tons
185 = 185 Nominal tons
200 = 200 Nominal tons
250 = 250 Nominal tons
275 = 275 Nominal tons
300 = 300 Nominal tons
350 = 350 Nominal tons
375 = 375 Nominal tons
400 = 400 Nominal tons

Digit 8 - Unit Voltage
D = 400/50/3

Digit 9 - Manufacturing Location
U = Water Chiller Business Unit, Pueblo, CO USA

Digits 10, 11 - Design Sequence
XX = Factory Input

Digit 12 - Unit Basic Configuration
N = Standard efficiency/performance
H = High efficiency/performance
A = Extra efficiency/performance

Digit 13 - Agency Listing
N = No agency listing
U = C/UL listing
S = Seismic rated - IBC and OSHPD
R = C/UL listed and seismic rated

Digit 14 - Pressure Vessel Code
A = ASME pressure vessel code
C = Canadian code
D = Australian code
L = Chinese code

Digit 15 - Evaporator Application
F = Standard (40-60 F) leaving temp
G = Low (Less than 40 F) leaving temp

Digit 16 - Evaporator Configuration
N = 2 pass, 0.75” insulation
P = 3 pass, 0.75” insulation
Q = 2 pass, 1.25” insulation
R = 3 pass, 1.25” insulation

Digit 17 - Condenser Application
N = Standard ambient (25-115°F)
H = High ambient (25-125°F)
L = Low ambient (0-115°F)
W = Wide ambient (0-125°F)

Digit 18 - Condenser Fin Material
1 = Standard aluminum slit fins
2 = Copper fins
4 = CompleteCoat™ epoxy coated fins

Digit 19 - Condenser Fan/Motor Configuration
T = STD fans with TEAO motors
W = Low noise fans

Digit 20 - Compressor Motor Starter Type
X = Across-the-line
Y = Wye-delta closed transition

Digit 21 - Incoming Power Line Connection
1 = Single point power connection
2 = Dual point power connection

Digit 22 - Power Line Connection Type
T = Terminal block connection
D = Non-fused disconnect switch(es)
C = Circuit breaker(s))

Digit 23 - Unit Operator Interface
D = DynaView operator interface

Digit 24 - Remote Operator Interface
N = No remote interface
C = Tracer™ Comm 3 interface
B = BACnet® interface
L = LonTalk® compatible (LCI-C) interface

Digit 25 - Control Input Accessories/Options
N = No remote inputs
R = Ext. evaporator leaving water setpoint
C = Ext. current limit setpoint
B = Ext. leaving water and current limit setpoint

Digit 26 - Control Output Accessories/Options
N = No output options
A = Alarm relay outputs
C = Ice making I/O
D = Alarm relay outputs and ice making I/O

Digit 27 - Electrical Protection Options
0 = No short circuit rating
5 = Default short circuit rating
6 = High amp short circuit rating

Digit 28 - Flow Switch
T = Factory installed flow switch - water
U = Factory installed flow switch glycol

Digit 29 - Control Panel Accessories
N = No convenience outlet

Digit 30 - Service Valves
1 = With suction service valves

Digit 31 - Compressor Sound Attenuation Option
0 = No compressor sound attenuation
1 = Factory installed compressor sound attenuation

Digit 32 - Appearance Options
N = No appearance options
A = Architectural louvered panels
C = Half louvers

Digit 33 - Installation Accessories
N = No installation accessories
F = Flange kit for water connections
R = Neoprene in shear unit isolators
G = Neoprene isolators and flange kit
E = Seismic elastomeric isolation pads
S = Seismic spring isolators

Digit 34 - Factory Testing Options
0 = Standard functional test
C = Customer-witnessed performance test with report
C = Customer-witnessed performance test plus Rapid Restart test
E = Non-witnessed performance test with report

Digit 35 — Control, Label & Literature
C = Spanish
E = English
F = French

Digit 36 — Special Order
X = Standard unit configuration
S = Unit has special order feature

Digit 37 — Safety Devices
N = Standard

General Data

Table 1. 50 Hz standard efficiency — I-P

Size		140	155	170	185	200	250	275	300	350	375	400
Compressor		Screw										
Quantity	#	2	2	2	2	2	3	3	3	4	4	4
Nominal size@50Hz	(tons)	70/70	85/70	85/85	100/85	100/100	70-70 / 100	85-85 / 100	100-100/100	85-85/ 85-85	100-100/ 85-85	100-100/ 100-100
Evaporator		Flooded										
Water storage	(gal)	29	32	34	36	40	56	62	67	75	79	83
2 pass arrangement												
Min flow	(gpm)	193	214	202	217	241	265	309	339	351	381	404
Max flow	(gpm)	709	785	741	796	883	970	1134	1243	1287	1396	1483
Water connection	(NPS-in)	4	4	6	6	6	8	8	8	8	8	8
3 pass arrangement												
Min flow	(gpm)	129	143	135	145	161	176	206	226	234	254	270
Max flow	(gpm)	473	523	494	531	589	647	756	829	858	930	989
Water connection	(NPS-in)	3.5	3.5	4	4	4	6	6	6	8	8	8
Condenser		Fin and tube										
Qty of coils	#	4	4	4	4	4	8	8	8	8	8	8
Coil length	(in)	156/156	180/156	180/180	216/180	216/216	156/108	180/108	216/108	180/180	216/180	216/216
Coil height	(in)	42	42	42	42	42	42	42	42	42	42	42
Number of rows	#	3	3	3	3	3	3	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192
Fan		Direct drive propeller										
Quantity	#	4/4	5/4	5/5	6/5	6/5	8/6	10/6	12/6	10/10	12/10	12/12
Diameter	(in)	30	30	30	30	30	30	30	30	30	30	30
Air flow per fan	(cfm)	7918	7723	7567	7567	7567	7764	7566	7567	7567	7567	7567
Power per motor	(hp)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Fan speed	(rpm)	950	950	950	950	950	950	950	950	950	950	950
Tip speed	(Ft/min)	7461	7461	7461	7461	7461	7461	7461	7461	7461	7461	7461
General Unit		HFC-134a										
# refrig ckts	#	2	2	2	2	2	2	2	2	2	2	2
% min load	%	15	15	15	15	15	15	15	15	15	15	15
Refrig charge	(lb)	175/175	215/205	215/215	225/215	225/225	235/235	235/235	415/200	460/200	415/415	460/460
Oil charge	(gal)	1.3/1.3	1.3/1.3	1.3/1.3	1.9/1.3	1.9/1.9	2.1-2.1/ 1.9	2.1-2.1/ 1.9	2.3-2.3/ 1.9	2.1-2.1/ 2.1-2.1	2.3-2.3/ 2.1-2.1	2.3-2.3/ 2.3-2.3
Min ambient-std	(°F)	25	25	25	25	25	25	25	25	25	25	25
Min ambient-low	(°F)	0	0	0	0	0	0	0	0	0	0	0

1. Data containing information on two circuits is shown as follows: ckt 1/ ckt 2.
2. Minimum start-up/operating ambient is based on a 5 mph wind across the condenser.

Table 2. 50 Hz high efficiency — I-P

Size		120	130	140	155	170	185	200	250	275	300	350	375	400
Compressor		Screw												
Quantity	#	2	2	2	2	2	2	2	3	3	3	4	4	4
Nominal size@50Hz	(tons)	60/60	70/60	70/70	85/70	85/85	100/ 85	100/ 100	70-70 / 100	85-85 / 100	100- 100/100	85-85 / 85-85	100-100/ 85-85	100-100/ 100-100
Evaporator		Flooded												
Water storage	(gal)	29	32	34	36	40	39	43	67	72	72	83	86	91
2 pass arrangement														
Min flow	(gpm)	193	214	202	217	241	217	241	339	375	375	404	422	461
Max flow	(gpm)	709	785	741	796	883	796	883	1243	1374	1374	1483	1548	1690
Water connection	(NPS-in)	4	4	6	6	6	6	6	8	8	8	8	8	8
3 pass arrangement														
Min flow	(gpm)	129	143	135	145	161	145	161	226	250	250	270	282	307
Max flow	(gpm)	473	523	494	531	589	531	589	829	916	916	989	1032	1127
Water connection	(NPS-in)	3.5	3.5	4	4	4	4	4	6	6	6	8	8	8
Condenser		Fin and tube												
Qty of coils	#	4	4	4	4	4	4	4	8	8	8	8	8	8
Coil length	(in)	156/ 156	180/ 156	180/ 180	216/ 180	216/ 216	252/ 216	252/ 252	180/ 108	216/ 144	252/144	216/216	252/216	252/252
Coil height	(in)	42	42	42	42	42	42	42	42	42	42	42	42	42
Number of rows	#	3	3	3	3	3	3	3	3	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan		Direct drive propeller												
Quantity	#	4/4	5/4	5/5	6/5	6/6	7/6	7/7	10/6	12/6	14/6	12/12	14/12	14/14
Diameter	(in)	30	30	30	30	30	30	30	30	30	30	30	30	30
Air flow per fan	(cfm)	62484	68819	7558	7557	7557	7558	7559	7561	7943	7906	7557	7490	7559
Power per motor	(hp)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Fan speed	(rpm)	950	950	950	950	950	950	950	950	950	950	950	950	950
Tip speed	(Ft/min)	7461	7461	7461	7461	7461	7461	7461	7461	7461	7461	7461	7461	7461
General Unit		HFC-134a												
# refrig ckts	#	2	2	2	2	2	2	2	2	2	2	2	2	2
% min load	%	15	15	15	15	15	15	15	15	15	15	15	15	15
Refrig charge	(lb)	165/ 165	175/ 165	175/ 175	215/ 205	215/ 215	225/ 215	225/ 225	365/ 200	415/ 200	460/ 200	415/ 415	460/ 415	460/ 460
Oil charge	(gal)	1.3/ 1.3	1.3/ 1.3	1.3/ 1.3	1.3/ 1.3	1.3/ 1.3	1.9/ 1.3	1.9/ 1.9	2.1- 2.1/1.9	2.1- 2.1/1.9	2.3-2.3/ 1.9	2.1-2.1/ 2.1-2.1	2.3-2.3/ 2.3-2.3	2.3-2.3/ 2.3-2.3
Min ambient-std	(°F)	25	25	25	25	25	25	25	25	25	25	25	25	25
Min ambient-low	(°F)	0	0	0	0	0	0	0	0	0	0	0	0	0

1. Data containing information on two circuits is shown as follows: ckt 1/ ckt 2.
2. Minimum start-up/operating ambient is based on a 5 mph wind across the condenser.

General Data

Table 3. 50 Hz standard efficiency — SI

Size		140	155	170	185	200	250	275	300	350	375	400
Compressor		Screw										
Quantity	#	2	2	2	2	2	3	3	3	4	4	4
Nominal size@50Hz	(tons)	70/70	85/70	85/85	100/85	100/100	70-70 / 100	85-85 / 100	100-100/100	85-85/ 85-85	100-100/ 85-85	100-100/ 100-100
Evaporator		Flooded										
Water storage	(L)	110	121	129	136	151	212	235	254	284	299	314
2 pass arrangement												
Min flow	(L/s)	12	14	13	14	15	17	19	21	22	24	25
Max flow	(L/s)	45	50	47	50	56	61	72	78	81	88	94
Water connection	(NPS-in)	4	4	6	6	6	8	8	8	8	8	8
3 pass arrangement												
Min flow	(L/s)	8	9	9	9	10	11	13	14	15	16	17
Max flow	(L/s)	30	33	31	34	37	41	48	52	54	59	62
Water connection	(NPS-in)	3.5	3.5	4	4	4	6	6	6	8	8	8
Condenser		Fin and tube										
Qty of coils	#	4	4	4	4	4	8	8	8	8	8	8
Coil length	(mm)	3962/ 3962	4572/ 3962	4572/ 4572	5486/ 4572	5486/ 5486	3962/ 2743	4572/ 2743	5486/ 2743	4572/ 4572	5486/ 4572	5486/ 5486
Coil height	(mm)	1067	1067	1067	1067	1067	1067	1067	1067	1067	1067	1067
Number of rows	#	3	3	3	3	3	3	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192
Fan		Direct drive propeller										
Quantity	#	4/4	5/4	5/5	6/5	6/6	8/6	10/6	12/6	10/10	12/10	12/12
Diameter	(mm)	762	762	762	762	762	762	762	762	762	762	762
Air flow per fan	(m^3/hr)	13452	13120	12855	12855	12855	13190	12853	12856	12854	12855	12855
Power per motor	(kW)	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Fan speed	(rps)	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8
Tip speed	M/S	38	38	38	38	38	38	38	38	38	38	38
General Unit		HFC-134a										
# refrig ckts	#	2	2	2	2	2	2	2	2	2	2	2
% min load	%	15	15	15	15	15	15	15	15	15	15	15
Refrig charge	(kg)	79/79	98/93	98/98	102/98	102/102	107/107	107/107	188/91	209/91	188/188	209/209
Oil charge	(L)	5/5	5/5	5/5	7/5	7/7	8-8/7	8-8/7	8-8/7	8-8/8-8	9-9/8-8	9-9/9-9
Min ambient-std	(°C)	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9
Min ambient-low	(°C)	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8

1. Data containing information on two circuits is shown as follows: ckt 1/ ckt 2.
2. Minimum start-up/operating ambient is based on a 5 mph wind across the condenser.

Table 4. 50 Hz high efficiency — SI

Size		120	130	140	155	170	185	200	250	275	300	350	375	400
Compressor		Screw												
Quantity	#	2	2	2	2	2	2	2	3	3	3	4	4	4
Nominal size@50Hz	(tons)	60/60	70/60	70/70	85/70	85/85	100/ 85	100/ 100	70-70 /100	85-85 /100	100-100/ 100	85-85 / 85-85	100-100/ 85-85	100-100/ 100-100
Evaporator		Flooded												
Water storage	(L)	110	121	129	136	151	148	163	254	273	273	314	326	344
2 pass arrangement														
Min flow	(L/s)	12	14	13	14	15	14	15	21	24	24	25	27	29
Max flow	(L/s)	45	50	47	50	56	50	56	78	87	87	94	98	107
Water connection	(NPS-in)	4	4	6	6	6	6	6	8	8	8	8	8	8
3 pass arrangement														
Min flow	(L/s)	8	9	9	9	10	9	10	14	16	16	17	18	19
Max flow	(L/s)	30	33	31	34	37	34	37	52	58	58	62	65	71
Water connection	(NPS-in)	3.5	3.5	4	4	4	4	4	6	6	6	8	8	8
Condenser		Fin and tube												
Qty of coils	#	4	4	4	4	4	4	4	8	8	8	8	8	8
Coil length	(mm)	3962/ 3962	4572/ 3962	4572/ 4572	5486/ 4572	5486/ 5486	6400/ 5486	6400/ 6400	4572/ 2743	5486/ 3657	6400/ 3657	5486/ 5486	6400/ 5486	6400/ 6400
Coil height	(mm)	1067	1067	1067	1067	1067	1067	1067	1067	1067	1067	1067	1067	1067
Number of rows	#	3	3	3	3	3	3	3	3	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan		Direct drive propeller												
Quantity	#	4/4	5/4	5/5	6/5	6/6	7/6	7/7	10/6	12/6	14/6	12/12	14/12	14/14
Diameter	(mm)	762	762	762	762	762	762	762	762	762	762	762	762	762
Air flow per fan	(m^3/hr)	62484	68819	12839	12839	12839	12840	12842	12844	13493	13430	12838	12724	12841
Power per motor	(kW)	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Fan speed	(rps)	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8
Tip speed	M/S	38	38	38	38	38	38	38	38	38	38	38	38	38
General Unit		HFC-134a												
# refrig ckts	#	2	2	2	2	2	2	2	2	2	2	2	2	2
% min load	%	15	15	15	15	15	15	15	15	15	15	15	15	15
Refrig charge	(kg)	75/75	79/75	79/79	98/93	98/98	102/ 95	102/ 102	166/ 91	188/ 91	209/ 91	188/ 188	209/ 188	209/ 209
Oil charge	(L)	5/5	5/5	5/5	5/5	5/5	7/5	7/7	8-8/ 7	8-8/ 7	8-8/ 7	8-8/ 8-8	9-9/ 9-9	9-9 9-9
Min ambient-std	(°C)	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9
Min ambient-low	(°C)	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8

1. Data containing information on two circuits is shown as follows: ckt 1/ ckt 2.
2. Minimum start-up/operating ambient is based on a 5 mph wind across the condenser.

Performance Data

Table 5. 50 Hz standard efficiency — I-P units

Evap Leaving Water Temp (°F)	Unit Size	Cond Entering Air Temp (°F) 85 Tons	85 kW Input²	85 EER³	95 Tons	95 kW Input²	95 EER³	105 Tons	105 kW Input²	105 EER³	115 Tons	115 kW Input²	115 EER³
40	140	134.4	143.3	10.7	124.4	156.7	9.1	114.3	171.5	7.7	103.9	187.9	6.4
	155	147.1	158.2	10.6	136.3	172.4	9.1	125.3	188.3	7.7	114	206	6.4
	170	160.5	173.6	10.5	148.9	188.8	9	137	205.8	7.7	124.7	224.8	6.4
	185	176.7	189.2	10.6	164.2	205.7	9.1	151.3	224.1	7.8	138.1	244.6	6.5
	200	193.9	205.6	10.7	180.5	223.3	9.3	166.6	243.2	7.9	152.3	265.2	6.6
	250	231	246.6	10.7	214.6	268.9	9.1	197.7	293.7	7.7	180.4	321.1	6.5
	275	258.1	278.3	10.6	239.8	302.2	9.1	220.9	329.1	7.7	201.7	358.9	6.5
	300	291.5	311.5	10.7	271.4	338	9.2	250.7	367.6	7.8	227.1	395.7	6.6
	350	324.8	352.5	10.5	301.5	382.9	9	277.6	417	7.7	250.9	450	6.4
	375	358.4	385.8	10.6	333.4	418.8	9.1	307.6	455.7	7.8	275.8	485.3	6.6
	400	391.5	418.9	10.7	364.7	454.3	9.2	336.9	494	7.8	300.9	522	6.6
42	140	139.3	146.4	10.9	129.1	159.9	9.3	118.6	174.9	7.8	106.8	188.9	6.5
	155	152.4	161.7	10.8	141.3	176.1	9.2	129.9	192.2	7.8	116.6	206.1	6.5
	170	166.2	177.6	10.7	154.2	192.9	9.2	141.9	210	7.8	127.6	225.3	6.5
	185	182.9	193.6	10.8	170	210.2	9.3	156.8	228.8	7.9	139.8	242.2	6.7
	200	200.8	210.4	10.9	186.9	228.3	9.4	172.6	248.4	8	154	262.5	6.8
	250	239.2	252.1	10.8	222.3	274.6	9.3	204.9	299.6	7.9	182.3	316.9	6.6
	275	267.2	284.7	10.7	248.3	308.8	9.2	228.9	335.9	7.8	203.2	353.4	6.6
	300	301.8	318.9	10.8	281	345.6	9.3	259.6	375.5	8	228.3	388.9	6.8
	350	336	360.6	10.6	312.1	391.2	9.1	287.5	425.6	7.8	253	442.9	6.6
	375	370.8	394.8	10.7	345	428	9.2	318.4	465.3	7.9	278.9	479.9	6.7
	400	405	428.6	10.8	377.3	464.4	9.3	348.8	504.6	8	303.9	515.7	6.8
44	140	144.2	149.6	11	133.7	163.3	9.4	123	178.4	7.9	107.9	185.9	6.7
	155	157.8	165.4	10.9	146.4	179.9	9.3	134.6	196	7.9	117.9	203.4	6.7
	170	172	181.7	10.8	159.6	197.1	9.3	146.9	214.3	7.9	128.7	221.6	6.7
	185	189.2	198	10.9	175.9	214.8	9.4	162.3	233.6	8	141.4	239.4	6.8
	200	207.7	215.3	11	193.4	233.4	9.5	178.6	253.8	8.1	155.6	259.3	6.9
	250	247.5	257.8	11	230.1	280.5	9.4	212.2	305.7	8	184.1	312.1	6.8
	275	276.4	291.3	10.8	256.9	315.7	9.3	236.9	343	8	204.6	347	6.8
	300	312.1	326.4	10.9	290.7	353.4	9.4	268.6	383.6	8.1	230.6	383.7	6.9
	350	347.4	368.8	10.8	322.7	399.7	9.3	297.4	434.3	7.9	254.8	434.9	6.8
	375	383.3	403.9	10.8	356.7	437.5	9.4	329.3	475	8	280.4	470.5	6.9
	400	418.7	438.7	10.9	390.2	474.9	9.4	360.7	515.4	8.1	305.1	504.9	7

Table 5. 50 Hz standard efficiency — I-P units

Evap Leaving Water Temp (°F)	Cond Entering Air Temp (°F)												
		85			95			105			115		
	Unit Size	Tons	kW Input[2]	EER[3]	Tons	kW Input[2]	EER[3]	Tons	kW Input[2]	EER[3]	Tons	kW Input[2]	EER[3]
46	140	149.3	152.9	11.2	138.5	166.6	9.5	127.4	181.9	8.1	109.1	183.2	6.9
	155	163.3	169.1	11	151.5	183.7	9.5	139.4	200	8	119.5	201	6.9
	170	177.8	185.8	10.9	165	201.4	9.4	152	218.8	8	129.6	217.5	6.9
	185	195.6	202.6	11	181.9	219.6	9.5	167.9	238.5	8.1	142.2	234.6	7
	200	214.7	220.3	11.1	200	238.7	9.6	184.8	259.2	8.2	156.3	253.7	7.1
	250	256	263.6	11.1	238	286.5	9.5	219.6	311.9	8.1	187.4	310.6	7
	275	285.7	298.1	11	265.6	322.6	9.5	245	350.1	8.1	206.7	342.2	7
	300	322.7	334.1	11	300.6	361.4	9.6	277.8	392	8.2	232.6	377.7	7.1
	350	358.9	377.2	10.9	333.5	408.3	9.4	307.4	443.1	8	257.5	428.8	6.9
	375	396	413.3	11	368.6	447.1	9.5	340.4	485	8.1	284.5	466.3	7
	400	432.6	448.9	11	403.2	485.5	9.5	372.9	526.6	8.2	309.3	499.8	7.1
48	140	154.4	156.3	11.3	143.2	170.1	9.7	131.9	185.5	8.2	109.6	178.8	7.1
	155	168.8	172.9	11.2	156.6	187.7	9.6	144.2	204	8.2	120.6	197.6	7
	170	183.6	190.1	11.1	170.5	205.8	9.5	157.1	223.2	8.1	131	214.3	7
	185	202	207.3	11.2	188	224.4	9.6	173.5	243.5	8.2	144	231.7	7.2
	200	221.8	225.5	11.3	206.6	244.1	9.7	190.9	264.9	8.3	157.6	249.3	7.3
	250	264.6	269.5	11.2	246.1	292.6	9.7	227.1	318.2	8.2	189.3	305.6	7.1
	275	295.1	305	11.1	274.4	329.7	9.6	253.2	357.4	8.2	208	335.2	7.1
	300	333.3	342	11.2	310.5	369.6	9.7	287	400.5	8.3	234.9	371.7	7.3
	350	370.6	385.9	11	344.4	417.1	9.5	317.6	452.1	8.1	259.3	420.4	7.1
	375	408.8	422.8	11.1	380.6	457	9.6	351.6	495.2	8.2	287	458	7.2
	400	446.6	459.5	11.1	416.3	496.5	9.6	385.1	538	8.3	312.5	492	7.3

1. Rated in accordance with AHRI Standard 550/590 based on TOPSS version 140: sea level altitude, evaporator fouling factor of 0.0001°F-ft²h/Btu, evaporator temperature drop of 10°F, and 2 pass evaporator configuration.Consult a Trane representative for additional performance information.
2. kW input is for compressors only.
3. EER = Energy Efficiency Ratio (Btu/watt-hour). Power inputs include compressors, condenser fans and control power.
4. Interpolation between points is permissible. Extrapolation is not permitted.

Table 6. 50 Hz high efficiency — I-P units

Evap Leaving Water Temp (°F)	Cond Entering Air Temp (°F)												
		85			95			105			115		
	Unit Size	Tons	kW Input[2]	EER[3]	Tons	kW Input[2]	EER[3]	Tons	kW Input[2]	EER[3]	Tons	kW Input[2]	EER[3]
40	120	114.2	113.6	11.3	105.9	124.1	9.7	97.4	135.9	8.2	88.7	149.2	6.8
	130	126.9	124.7	11.4	117.7	136.2	9.8	108.4	149.1	8.3	98.8	163.5	6.9
	140	140.3	136.2	11.6	130.4	148.8	9.9	120.1	162.8	8.4	109.7	178.4	7
	155	152.8	150.3	11.4	142	163.7	9.8	130.9	178.8	8.3	119.5	195.6	7
	170	166.1	165	11.3	154.3	179.2	9.7	142.3	195.3	8.3	129.9	213.3	7
	185	183.1	180.9	11.4	170.6	196.3	9.8	157.7	213.8	8.4	144.4	233.3	7.1
	200	201.2	197.4	11.5	187.8	214.1	9.9	173.8	232.8	8.5	159.5	253.8	7.2
	250	238.6	240.7	11.2	221.9	261.9	9.6	204.7	285.7	8.2	187.1	312.2	6.9
	275	267.6	266	11.4	249.2	288.5	9.8	230.2	313.8	8.4	210.8	342.1	7.1
	300	301.5	298.9	11.4	281.5	323.7	9.9	260.8	351.6	8.5	239.5	382.9	7.2
	350	335.9	335.4	11.3	312.6	363.9	9.7	288.6	396.1	8.3	263.9	432.1	7
	375	370.5	368.6	11.3	345.5	399.4	9.8	319.7	434.3	8.4	293.2	473.3	7.1
	400	405.9	402.4	11.4	379.1	435.5	9.9	351.3	472.9	8.5	322.6	514.8	7.2
42	120	118.6	116.1	11.5	110.2	126.6	9.9	101.4	138.6	8.3	92.3	151.9	7
	130	131.8	127.4	11.6	122.4	139	10	112.7	152	8.4	102.8	166.5	7.1
	140	145.7	139.1	11.8	135.4	151.7	10.1	124.9	165.9	8.6	114.1	181.6	7.2
	155	158.6	153.6	11.6	147.5	167.1	10	136	182.3	8.5	124.3	199.1	7.1
	170	172.3	168.7	11.5	160.2	183	9.9	147.7	199.2	8.4	135	217.3	7.1
	185	189.8	184.9	11.6	176.9	200.5	10	163.6	218.1	8.5	149.9	237.8	7.2
	200	208.6	201.9	11.7	194.7	218.7	10.1	180.4	237.7	8.7	165.6	258.8	7.3
	250	247.5	246	11.4	230.2	267.4	9.8	212.5	291.5	8.3	192.2	314.1	7
	275	277.5	272.1	11.5	258.5	294.7	10	238.9	320.2	8.5	218.9	348.7	7.2
	300	312.6	305.8	11.6	291.9	330.8	10.1	270.6	359	8.6	248.5	390.6	7.3
	350	348.1	342.9	11.4	324.1	371.5	9.9	299.3	403.9	8.4	273.9	440.2	7.1
	375	383.9	376.9	11.5	358.2	408	10	331.6	443.2	8.5	304.2	482.5	7.2
	400	420.6	411.6	11.5	392.9	445	10	364.2	482.8	8.6	334.7	525.1	7.3
44	120	123.2	118.6	11.7	114.4	129.2	10	105.4	141.3	8.5	96	154.7	7.1
	130	136.8	130.1	11.8	127.1	141.8	10.2	117.2	154.9	8.6	107	169.5	7.2
	140	151.2	142	12	140.6	154.8	10.3	129.8	169	8.7	118.7	184.8	7.3
	155	164.4	156.9	11.8	153	170.5	10.2	141.2	185.8	8.7	129.1	202.8	7.3
	170	178.5	172.5	11.7	166.1	186.9	10.1	153.2	203.2	8.6	140.1	221.4	7.3
	185	196.7	189.1	11.7	183.4	204.8	10.2	169.7	222.5	8.7	155.6	242.3	7.4
	200	216.2	206.5	11.8	201.8	223.5	10.3	187	242.6	8.8	171.7	264	7.5
	250	256.5	251.5	11.6	238.7	273.1	10	220.4	297.4	8.5	193.1	307.5	7.2
	275	287.5	278.3	11.7	267.9	301	10.1	247.7	326.7	8.7	227.1	355.4	7.3
	300	323.9	312.8	11.7	302.5	338	10.2	280.5	366.5	8.8	257.8	398.4	7.4
	350	360.5	350.5	11.6	335.7	379.4	10	310.2	411.9	8.6	284.1	448.3	7.3
	375	397.5	385.4	11.7	371	416.8	10.1	343.5	452.2	8.7	315.4	491.7	7.4
	400	435.5	421.1	11.7	406.9	454.8	10.2	377.4	492.9	8.8	347	535.6	7.4

Table 6. 50 Hz high efficiency — I-P units

Evap Leaving Water Temp (°F)	Cond Entering Air Temp (°F)												
		85			95			105			115		
	Unit Size	Tons	kW Input²	EER³	Tons	kW Input²	EER³	Tons	kW Input²	EER³	Tons	kW Input²	EER³
46	120	127.8	121.2	11.9	118.8	131.9	10.2	109.4	144	8.7	99.8	157.5	7.3
	130	141.9	132.9	12	131.9	144.7	10.3	121.7	157.9	8.8	111.1	172.5	7.4
	140	156.7	145	12.2	145.8	157.9	10.5	134.7	172.2	8.9	122.9	187.5	7.5
	155	170.3	160.3	12	158.6	174	10.3	146.4	189.4	8.8	133.7	205.8	7.4
	170	184.9	176.3	11.8	172	190.9	10.2	158.8	207.2	8.7	145.3	225.5	7.4
	185	203.6	193.3	11.9	189.9	209.2	10.3	175.8	227.1	8.8	161.3	247	7.5
	200	223.8	211.2	12	209	228.4	10.4	193.7	247.7	8.9	178	269.3	7.6
	250	265.6	257.1	11.7	247.2	278.9	10.1	228.4	303.4	8.6	194	301	7.4
	275	297.7	284.6	11.9	277.5	307.5	10.3	256.7	333.4	8.8	235.4	362.3	7.5
	300	335.2	320.1	11.9	313.2	345.5	10.3	290.5	374.3	8.9	267.1	406.5	7.6
	350	373	358.3	11.8	347.5	387.3	10.2	321.2	420.1	8.7	294.3	456.6	7.4
	375	411.3	394.1	11.8	383.9	425.7	10.3	355.7	461.4	8.8	326.7	501.2	7.5
	400	450.6	430.8	11.9	421.2	464.8	10.3	390.8	503.3	8.9	359.4	546.3	7.6
48	120	132.5	123.8	12.1	123.2	134.7	10.4	113.5	146.8	8.8	103.6	160.3	7.4
	130	147	135.8	12.2	136.8	147.6	10.5	126.2	160.9	9	115	175	7.5
	140	162.3	148.1	12.4	151.1	161	10.7	139.6	175.5	9.1	126.2	188.2	7.7
	155	176.3	163.8	12.2	164.2	177.6	10.5	151.7	193.1	9	137.9	208.2	7.6
	170	191.3	180.3	12	178.1	194.9	10.4	164.5	211.4	8.9	150.6	229.7	7.5
	185	210.6	197.7	12.1	196.5	213.7	10.5	182	231.7	9	167	251.8	7.6
	200	231.6	216.1	12.2	216.3	233.4	10.6	200.6	252.9	9.1	183.9	273.8	7.7
	250	274.8	262.9	11.9	255.9	284.9	10.3	236.5	309.5	8.8	194.7	293.9	7.6
	275	308	291.1	12	287.2	314.2	10.4	265.7	340.2	9	243.1	367.9	7.6
	300	346.8	327.5	12	324.1	353.2	10.5	300.7	382.2	9	275.7	412.9	7.7
	350	385.7	366.3	11.9	359.4	395.5	10.3	332.4	428.4	8.9	303.4	462.3	7.5
	375	425.3	403	12	397.1	434.9	10.4	368	470.8	8.9	335.1	504.6	7.6
	400	466	440.7	12	435.7	475	10.5	404.3	513.9	9	365.8	544.8	7.7

1. Rated in accordance with AHRI Standard 550/590 based on TOPSS version 140: sea level altitude, evaporator fouling factor of 0.0001°F-ft²h/Btu, evaporator temperature drop of 10°F, and 2 pass evaporator configuration.Consult a Trane representative for additional performance information.
2. kW input is for compressors only.
3. EER = Energy Efficiency Ratio (Btu/watt-hour). Power inputs include compressors, condenser fans and control power.
4. Interpolation between points is permissible. Extrapolation is not permitted.

Table 7. AHRI and Part Load Performance — 50 Hz — I-P units

Standard Efficiency			
Unit Size	Full Load Tons	Full Load EER	IPLV
140	133.7	9.4	14.4
155	146.4	9.3	14.4
170	159.6	9.3	14.1
185	175.9	9.4	14.5
200	193.4	9.5	14.2
250	230.1	9.4	16.1
275	256.7	9.3	15.7
300	290.6	9.4	15.7
350	322.4	9.3	16.2
375	356.3	9.4	16.4
400	389.8	9.4	16.4

High Efficiency			
Unit Size	Full Load Tons	Full Load EER	IPLV
120	114.4	10.0	14.8
130	127.1	10.2	15.2
140	140.6	10.3	15.1
155	153.0	10.2	15.1
170	166.0	10.1	14.9
185	183.4	10.2	15.2
200	201.8	10.3	14.9
250	238.7	10.0	16.0
275	267.9	10.1	16.1
300	302.5	10.2	16.2
350	335.7	10.0	16.4
375	370.9	10.1	16.6
400	406.9	10.2	16.6

1. IPLV values are rated in accordance with AHRI Standard 550/590.
2. EER and IPLV values include compressors, condenser fans, and control kW.

Table 8. 50 Hz standard efficiency — SI units

Evap Leaving Water Temp (°C)	Cond Entering Air Temp (°C)												
						35			40			45	
	Unit Size	kW Cooling	kW Input[2]	COP[3]	kW Cooling	kW Input[2]	COP[3]	kW Cooling	kW Input[2]	COP[3]	kW Cooling	kW Input[2]	COP[3]
5	140	477.12	146	3.11	445.13	158.2	2.69	412.78	171.6	2.31	379.73	186.2	1.96
	155	522.48	161.2	3.08	487.67	174.2	2.67	452.16	188.5	2.3	416.29	204.2	1.96
	170	569.94	176.9	3.06	532.32	190.7	2.66	494	206	2.3	454.97	222.9	1.96
	185	627.25	192.8	3.09	587.17	207.8	2.69	545.68	224.4	2.33	503.84	242.6	2
	200	688.43	209.5	3.12	645.19	225.7	2.73	600.53	243.5	2.36	554.83	263.2	2.03
	250	819.93	251.3	3.1	767.19	271.5	2.7	713.05	293.9	2.33	657.84	318.3	1.99
	275	915.57	283.5	3.07	856.85	305.3	2.68	796.73	329.4	2.32	735.2	356	1.99
	300	1034.41	317.4	3.1	969.71	341.4	2.71	903.26	368.1	2.35	835.05	397.4	2.02
	350	1152.19	359.1	3.05	1077.65	386.8	2.66	1001.01	417.5	2.3	922.95	451.3	1.97
	375	1271.39	393.1	3.08	1190.87	423	2.69	1108.24	456.3	2.33	1023.86	492.9	2
	400	1389.17	426.8	3.1	1303.03	459	2.71	1214.08	494.7	2.35	1123.01	534.1	2.02
7	140	508.06	151.8	3.19	474.66	164.2	2.77	440.55	177.7	2.38	405.39	192.5	2.03
	155	556.23	167.8	3.16	519.31	180.9	2.75	482.04	195.4	2.37	441.96	210	2.03
	170	605.81	184.2	3.13	566.43	198.2	2.73	525.99	213.7	2.36	482.75	229.5	2.02
	185	666.63	200.9	3.16	624.44	216.1	2.76	580.84	233	2.39	531.62	248.4	2.06
	200	732.03	218.3	3.19	686.32	234.8	2.79	639.21	253.1	2.42	582.6	268	2.09
	250	871.97	261.5	3.18	816.42	282.1	2.77	759.46	304.7	2.39	690.89	323	2.06
	275	973.23	295.4	3.14	911.35	317.5	2.74	847.36	342	2.38	768.6	360.1	2.05
	300	1099.45	330.9	3.17	1030.89	355.4	2.77	960.57	382.6	2.41	863.53	396.9	2.09
	350	1223.57	374	3.12	1144.81	402	2.72	1064.29	433	2.36	956.7	450.9	2.04
	375	1350.14	409.5	3.14	1265.06	440	2.75	1177.86	473.7	2.39	1054.45	489.1	2.07
	400	1475.31	444.8	3.16	1383.9	477.7	2.77	1290.37	514.1	2.41	1149.73	526.3	2.1
9	140	540.06	157.8	3.27	504.55	170.3	2.84	468.68	184.1	2.45	412.43	186.7	2.13
	155	590.69	174.6	3.23	552.01	187.9	2.81	512.63	202.6	2.43	449.34	204.1	2.12
	170	642.37	191.8	3.19	600.88	206	2.79	558.34	221.7	2.42	489.08	222	2.12
	185	707.07	209.3	3.22	662.41	224.7	2.82	616.71	241.9	2.45	536.89	239.8	2.15
	200	776.33	227.6	3.26	728.16	244.4	2.85	678.59	263.1	2.48	590.34	259.7	2.18
	250	925.76	272.1	3.25	867.05	293	2.83	806.92	316	2.46	704.96	315.5	2.15
	275	1032.3	307.8	3.2	966.55	330.2	2.8	899.39	355	2.44	779.85	349.6	2.14
	300	1165.91	345.1	3.23	1093.83	370	2.83	1019.29	397.7	2.46	878.3	386.6	2.18
	350	1296.35	389.4	3.18	1213.37	417.7	2.78	1128.64	449	2.42	971.12	437.6	2.13
	375	1430.31	426.7	3.2	1341	457.6	2.81	1248.88	491.8	2.44	1068.16	473.4	2.17
	400	1563.21	463.7	3.22	1466.88	497.2	2.83	1368.08	534.4	2.46	1162.04	508	2.2

1. Ratings based on TOPSS version 140: evaporator fouling factor of 0.01761m²°C/kW, evaporator temperature drop of 5°C, and2 pass evaporator configuration. Consult Trane representative for additional performance information.
2. kW input is for compressors only; COP = Coefficient of Performance.
3. Power inputs include compressors and control power.
4. Interpolation between points is permissible. Extrapolation is not permitted.

Table 9. 50 Hz high efficiency — SI units

Evap Leaving Water Temp (°C)		Cond Entering Air Temp (°C)											
		35			40			45					
	Unit Size	kW Cooling	kW Input[2]	COP[3]	kW Cooling	kW Input[2]	COP[3]	kW Cooling	kW Input[2]	COP[3]	kW Cooling	kW Input[2]	COP[3]
	120	406.1	115.8	3.29	379.73	125.3	2.86	352.3	136	2.46	324.53	147.8	2.09
	130	451.1	127.1	3.33	421.92	137.6	2.89	392.03	149.2	2.49	361.44	162	2.12
	140	498.92	138.8	3.37	466.92	150.2	2.93	434.23	162.8	2.52	400.82	176.7	2.16
	155	543.22	153.2	3.32	508.41	165.3	2.9	472.9	178.9	2.5	436.69	193.8	2.14
	170	589.99	168.1	3.29	552.36	181	2.88	513.69	195.5	2.49	474.31	211.5	2.13
	185	650.46	184.2	3.32	610.38	198.3	2.9	568.89	214	2.52	526.7	231.3	2.17
5	200	714.8	201	3.34	671.56	216.2	2.93	626.9	233.1	2.55	581.2	251.8	2.2
	250	847.71	245.2	3.26	793.91	264.5	2.84	739.06	286	2.46	682.81	309.6	2.11
	275	950.73	271	3.31	891.31	291.4	2.9	830.83	314.1	2.52	768.6	339.3	2.16
	300	1070.97	304.4	3.32	1006.63	326.9	2.92	940.53	352.1	2.54	872.32	379.9	2.19
	350	1192.98	341.6	3.28	1118.09	367.5	2.87	1041.09	396.4	2.49	962.33	428.4	2.14
	375	1315.69	375.3	3.3	1235.52	403.4	2.89	1152.9	434.7	2.52	1068.16	469.5	2.17
	400	1441.91	409.8	3.31	1355.42	440	2.91	1266.46	473.6	2.54	1175.05	510.9	2.19
	120	434.58	120.3	3.4	406.45	130	2.96	377.62	140.8	2.55	348.08	152.7	2.18
	130	482.4	132	3.44	451.45	142.6	2.99	419.81	154.4	2.58	387.46	167.3	2.21
	140	533.03	144.1	3.47	499.27	155.6	3.03	464.82	168.4	2.62	429.66	182.4	2.24
	155	579.79	159.1	3.42	543.22	171.5	2.99	505.6	185.2	2.59	467.63	200.3	2.23
	170	629.36	174.9	3.38	589.63	188	2.96	548.85	202.6	2.57	507.01	218.7	2.21
	185	693.36	191.7	3.41	650.81	206	2.99	607.21	221.9	2.6	562.56	239.5	2.24
7	200	761.92	209.3	3.43	716.21	224.8	3.02	669.1	242	2.63	620.57	260.9	2.27
	250	903.96	255.1	3.35	847.36	274.7	2.93	788.99	296.5	2.54	725.7	318.3	2.18
	275	1013.66	282.1	3.39	951.08	302.8	2.98	886.74	325.8	2.59	820.99	351.3	2.24
	300	1141.29	317.1	3.41	1073.44	340	3	1003.12	365.5	2.62	931.04	393.9	2.26
	350	1270.68	355.3	3.37	1191.57	381.5	2.95	1110.35	410.7	2.57	1027.38	443	2.21
	375	1401.13	390.6	3.38	1316.39	419.1	2.97	1228.84	450.9	2.59	1139.54	486	2.24
	400	1535.44	426.8	3.39	1444.37	457.5	2.99	1350.14	491.7	2.61	1253.45	529.5	2.26
	120	463.76	125	3.5	434.23	134.9	3.05	403.64	145.7	2.64	372.34	157.7	2.26
	130	514.74	137.1	3.54	482.04	147.9	3.09	448.64	159.7	2.67	414.54	172.8	2.29
	140	568.19	149.5	3.58	532.67	161.2	3.13	496.46	174.2	2.71	458.13	187.7	2.33
	155	617.41	165.4	3.52	578.73	177.9	3.08	539.35	191.8	2.67	497.87	206.3	2.3
	170	669.45	181.9	3.47	627.61	195.2	3.05	584.71	209.9	2.65	540.76	226.2	2.28
	185	737.31	199.5	3.49	692.65	214	3.07	646.59	230.1	2.68	599.48	247.9	2.31
9	200	810.44	218	3.51	762.27	233.7	3.1	712.34	251.2	2.7	661.36	270.5	2.34
	250	961.63	265.4	3.43	901.85	285.3	3.01	840.32	307.3	2.61	730.98	305.8	2.28
	275	1078.01	293.7	3.48	1011.91	314.6	3.06	944.05	337.9	2.67	874.78	363.7	2.31
	300	1213.72	330.3	3.48	1141.65	353.6	3.07	1067.81	379.6	2.69	991.51	408.4	2.33
	350	1350.14	369.6	3.45	1266.46	396	3.03	1181.02	425.5	2.64	1093.83	458	2.28
	375	1488.67	406.6	3.46	1399.02	435.4	3.05	1306.9	467.6	2.66	1212.67	503.2	2.31
	400	1631.42	444.6	3.47	1535.09	475.7	3.07	1435.93	510.5	2.68	1330.81	547.2	2.33

1. Ratings based on TOPSS version 140: evaporator fouling factor of 0.01761m²°C/kW, evaporator temperature drop of 5°C, and2 pass evaporator configuration. Consult Trane representative for additional performance information.
2. kW input is for compressors only; COP = Coefficient of Performance.
3. Power inputs include compressors and control power.
4. Interpolation between points is permissible. Extrapolation is not permitted.

Controls

LCD Touch Screen Display

The standard DynaView display provided with the Trane CH530 control panel features an LCD touch screen that is navigated by file tabs. This is an advanced interface that allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics. It uses full text display available in 19 languages.

Display Features Include:

- LCD touch screen with LED backlighting, for scrolling access to input and output operating information
- Single screen, folder/tab style display of all available information on individual components (evaporator, condenser, compressor, etc.)
- Password entry/lockout system to enable or disable display
- Automatic and immediate stop capabilities for standard or immediate manual shutdown
- Fast, easy access to available chiller data in tabbed format, including:
  - Modes of operation, including normal cooling as well as ice making
  - Water temperatures and setpoints
  - Loading and limiting status and setpoints
  - Outdoor air temperature
  - Start/stop differential timers
  - Pump status and override
  - Chilled water reset settings
- Optional external setpoints, including:
  - Chilled water, demand limit, ice building

Reports, listed on a single tabbed screen for easy access, including:

- ASHRAE, containing all guideline 3 report information
- Evaporator, condenser, compressor

Evaporator, condenser, and compressor reports containing all operational information on individual components, including:

- Water temperatures, refrigerant pressures, temperatures, and approach
- Flow switch status, EXV position, compressor starts and run time

Alarm and diagnostic information, including:

- Flashing alarms with touch screen button for immediate address of alarm condition
- Scrollable list of last ten active diagnostics
- Specific information on applicable diagnostic from list of over one hundred
- Automatic or manual resetting diagnostic types

Adaptive Controls

Adaptive Controls directly sense the control variables that govern the operation of the chiller: evaporator pressure and condenser pressure. When any one of these variables approaches a limit condition when damage may occur to the unit or shutdown on a safety, Adaptive Controls takes corrective action to avoid shutdown and keep the chiller operating. This happens through combined actions of compressor and/or fan staging. Whenever possible, the chiller is allowed to continue making chilled water. This keeps cooling capacity available until the problem can be solved. Overall, the safety controls help keep the building or process running and out of trouble.

Stand Alone Controls

Single chillers installed in applications without a building management system is simple to install and control: only a remote auto/stop for scheduling is required for unit operation. Signals from the chilled water pump contactor auxiliary, or a flow switch, are wired to the chilled water flow interlock. Signals from a time clock or some other remote device are wired to the external auto/stop input.

- External Auto/Stop - A job site provided contact closure will turn the unit on and off.
- Chilled Water Flow Interlock - A job site provided contact closure from a chilled water pump contactor or a flow switch is required and will allow unit operation if a load exists. This feature will allow the unit to run in conjunction with the pump system.
- External Interlock - A job site supplied contact opening wired to this input will turn the unit off and require a manual reset of the unit microcomputer. This closure is typically triggered by a job site supplied system such as a fire alarm.
- Chilled Water Pump Control - Unit controls provide an output to control the chilled water pump(s). One contact closure to the chiller is all that is required to initiate the chilled water system. Chilled water pump control by the chiller is a requirement on the Air-Cooled Series R.
- Chilled Water Temperature Reset - The reset can be based on return water temperature or outdoor air temperature.

Hardwire Points

Microcomputer controls allow simple interface with other control systems, such as time clocks, building automation systems, and ice storage systems via hardwire points. This means you have the flexibility to meet job requirements while not having to learn a complicated control system.

Remote devices are wired from the control panel to provide auxiliary control to a building automation system. Inputs and outputs can be communicated via a typical 4–20 mA electrical signal, an equivalent 2–10 Vdc signal, or by utilizing contact closures. Contact closures may be used to trigger job site supplied alarm lights or alarm bells.

This setup has the same features as a stand alone water chiller, with the possibility of having additional optional features:

- Circuit enable/disable
- Ice making enable/status
- External chilled water setpoint, external demand limit setpoint
- Alarm indication contacts provides three single pole double throw contact closures to indicate: compressor on/off status, compressor running at maximum capacity, failure has occurred (ckt 1/ckt 2)

BACnet Interface

BACnet interface capabilities are available, with communication link via single twisted-pair wiring to a factory-installed and tested communication board.

Required features:

- BACnet Interface (selectable option with chiller)

BACnet is a data communication protocol for building automation and control networks developed by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

LonTalk LCI-C Interface

LonTalk (LCI-C) communications capabilities are available, with communication link via single twisted pair wiring to factory installed, tested communication board.

- Required features: LonTalk/Tracer Summit Interface (selectable option with chiller)

LonTalk is a communications protocol developed by the Echelon Corporation. The LonMark association develops control profiles using the LonTalk communication protocol. LonTalk is a unit level communications protocol.

LonTalk Communications Interface for Chillers (LCI-C) provides a generic automation system with the LonMark chiller profile inputs/outputs. In addition to the standard points, Trane provides other commonly used network output variables for greater interoperability with any automation system. The complete reference list of Trane LonTalk points is available on the LonMark web site.

Trane controls or another vendor's system can use the predefined list of points with ease to give the operator a complete picture of how the system is running

Tracer Summit

The chiller plant control capabilities of the Trane Tracer Summit building automation system are unequaled in the industry. Trane's depth of experience in chillers and controls makes us a well qualified choice for automation of chiller plants using air-cooled chillers. Our chiller plant automation software is fully pre-engineered and tested.

Required features:

- LonTalk/Tracer Summit Interface (selectable option with chiller)
- Building Control Unit (external device required)

Energy Efficiency

- Sequences starting of chillers to optimize the overall chiller plant energy efficiency
  - Individual chillers operate as base, peak, or swing based on capacity and efficiency
  - Automatically rotates individual chiller operation to equalize runtime and wear between chillers.
  - Evaluates and selects the lowest energy consumption alternative from an overall system perspective.

Easy Operation and Maintenance

- Remote monitoring and control
- Displays both current operation conditions and scheduled automated control actions
- Concise reports assist in planning for preventative maintenance and verifying performance
- Alarm notification and diagnostic messages aid in quick and accurate troubleshooting

Tracer SC

The Tracer SC system controller acts as the central coordinator for all individual equipment devices on a Tracer building automation system. The Tracer SC scans all unit controllers to update information and coordinate building control, including building subsystems such as VAV and chiller water systems. With this system option, the full breadth of Trane's HVAC and controls experience are applied to offer solutions to many facility issues. The LAN allows building operators to manage these varied components as one system from any personal computer with web access. The benefits of this system are:

- Improved usability with automatic data collection, enhanced data logging, easier to create graphics, simpler navigation, pre-programmed scheduling, reporting, and alarm logs.
- Flexible technology allows for system sizes from 30-120 unit controllers with any combination of LonTalk or BACnet unit controllers.
- LEED certification through site commissioning report, energy data collection measurement, optimizing energy performance, and maintaining indoor air quality.
- Energy savings programs include: fan pressure optimization, ventilation reset, and chiller plant control (adds and subtracts chillers to meet cooling loads).

Electrical Data

Table 10. Standard efficiency — all ambient options

Unit Size	Rated Voltage[1]	# Power Conn[2]	# Comp	# Fan Ckt1 / Ckt2	Fan kW	Fan FLA	VFD Input	Cntrl kVA[3]	RLA[4] Ckt1 / Ckt2	XLRA[5] Ckt1 / Ckt2	YLRA[5] Ckt1 / Ckt2	MCA[6] Ckt1 / Ckt2	MOP[7] Ckt1 / Ckt2
140	400/50/3	1	2	8	1.5	2.8	3.7	0.83	138/138	896/896	291/291	337	450
	400/50/3	2	2	4/4	1.5	2.8	3.7	0.83	138/138	896/896	291/291	187/185	300/300
155	400/50/3	1	2	9	1.5	2.8	3.7	0.83	168/138	1089/896	354/291	377	500
	400/50/3	2	2	5/4	1.5	2.8	3.7	0.83	168/138	1089/896	354/291	227/185	350/300
170	400/50/3	1	2	10	1.5	2.8	3.7	0.83	168/168	1089/1089	354/354	410	500
	400/50/3	2	2	5/5	1.5	2.8	3.7	0.83	168/168	1089/1089	354/354	227/225	350/350
185	400/50/3	1	2	11	1.5	2.8	3.7	0.83	198/168	1089/1089	354/354	450	600
	400/50/3	2	2	6/5	1.5	2.8	3.7	0.83	198/168	1089/1089	354/354	267/225	450/350
200	400/50/3	1	2	12	1.5	2.8	3.7	0.83	198/198	1089/1089	354/354	483	600
	400/50/3	2	2	6/6	1.5	2.8	3.7	0.83	198/198	1089/1089	354/354	267/265	450/450
250	400/50/3	1	3	14	1.5	2.8	3.7	1.2	138-138/198	896-896/1089	291-291/354	569	700
	400/50/3	2	3	8/6	1.5	2.8	3.7	1.2	138-138/198	896-896/1089	291-291/354	336/267	450/450
275	400/50/3	1	3	16	1.5	2.8	3.7	1.2	168-168/198	1089-1089/1089	354-354/354	636	800
	400/50/3	2	3	10/6	1.5	2.8	3.7	1.2	168-168/198	1089-1089/1089	354-354/354	410/267	500/450
300	400/50/3	1	3	18	1.5	2.8	3.7	1.2	198-198/198	1089-1089/1089	354-354/354	702	800
	400/50/3	2	3	12/6	1.5	2.8	3.7	1.2	198-198/198	1089-1089/1089	354-354/354	483/267	600/450
350	400/50/3	1	4	20	1.5	2.8	3.7	1.59	168-168/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	778	800
	400/50/3	2	4	10/10	1.5	2.8	3.7	1.59	168-168/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	410/410	500/500
375	400/50/3	1	4	22	1.5	2.8	3.7	1.59	198-198/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	851	1000
	400/50/3	2	4	12/10	1.5	2.8	3.7	1.59	198-198/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	483/410	600/500
400	400/50/3	1	4	24	1.5	2.8	3.7	1.59	198-198/ 198-198	1089-1089/ 1089-1089	354-354/ 354-354	916	1000
	400/50/3	2	4	12/12	1.5	2.8	3.7	1.59	198-198/ 198-198	1089-1089/ 1089-1089	354-354/ 354-354	483/483	600/600

Notes:

1. Voltage Utilization Range: +/- 10% of rated voltage. Rated voltage (use range): 400 volt (360-440)
2. As standard, 140-200 ton units have a single point power connection. Optional dual point power connections are available. As standard, 250-400 ton units have dual point power connections. Optional single point power connections are available on 400V/50 Hz units.
3. Control VA includes operational controls only. It does not include evaporator heaters. A separate 220/50/1, 15 amp customer provided power connection is required to power the evaporator heaters (1640 watts).
4. RLA - Rated Load Amps
5. XLRA - Locked Rotor Amps - based on full winding (x-line) start units). YLRA for wye-delta starters is ~1/3 of LRA of x-line units.
6. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of all other loads.
7. Max fuse or MOPD = 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA, plus the sum of the condenser fan FLA. (Use FLA per circuit, NOT FLA for the entire unit).
8. Local codes may take precedence.
9. All ambient means standard, low, high and wide ambient options.

Table 11. High efficiency — standard and low ambient options

Unit Size	Rated Voltage[1]	# Power Conn[2]	# Comp	# Fan Ckt1 / Ckt2	Fan kW	Fan FLA	VFD Input	Cntrl kVA[3]	RLA[4] Ckt1 / Ckt2	XLRA[5] Ckt1 / Ckt2	YLRA[5] Ckt1 / Ckt2	MCA[6] Ckt1 / Ckt2	MOP[7] Ckt1 / Ckt2
120	400/50/3	1	2	8	1.5	2.8	3.7	0.83	113/113	796/796	259/259	280	350
	400/50/3	2	2	4/4	1.5	2.8	3.7	0.83	113/113	796/796	259/259	155/153	250/250
130	400/50/3	1	2	9	1.5	2.8	3.7	0.83	132/113	896/796	291/259	307	400
	400/50/3	2	2	5/4	1.5	2.8	3.7	0.83	132/113	896/796	291/259	182/153	300/250
140	400/50/3	1	2	10	1.5	2.8	3.7	0.83	132/132	896/896	291/291	329	450
	400/50/3	2	2	5/5	1.5	2.8	3.7	0.83	132/132	896/896	291/291	182/180	300/300
155	400/50/3	1	2	11	1.5	2.8	3.7	0.83	160/132	1089/896	354/291	367	500
	400/50/3	2	2	6/5	1.5	2.8	3.7	0.83	160/132	1089/896	354/291	220/180	350/300
170	400/50/3	1	2	12	1.5	2.8	3.7	0.83	160/160	1089/1089	354/354	397	500
	400/50/3	2	2	6/6	1.5	2.8	3.7	0.83	160/160	1089/1089	354/354	220/218	350/350
185	400/50/3	1	2	13	1.5	2.8	3.7	0.83	189/160	1089/1089	354/354	436	600
	400/50/3	2	2	7/6	1.5	2.8	3.7	0.83	189/160	1089/1089	354/354	259/218	400/350
200	400/50/3	1	2	14	1.5	2.8	3.7	0.83	189/189	1089/1089	354/354	468	600
	400/50/3	2	2	7/7	1.5	2.8	3.7	0.83	189/189	1089/1089	354/354	259/257	400/400
250	400/50/3	1	3	16	1.5	2.8	3.7	1.2	132-132/189	896-896/1089	291-291/354	553	700
	400/50/3	2	3	10/6	1.5	2.8	3.7	1.2	132-132/189	896-896/1089	291-291/354	329/256	450/400
275	400/50/3	1	3	18	1.5	2.8	3.7	1.2	160-160/189	1089-1089/1089	354-354/354	614	800
	400/50/3	2	3	12/6	1.5	2.8	3.7	1.2	160-160/189	1089-1089/1089	354-354/354	397/256	500/400
300	400/50/3	1	3	20	1.5	2.8	3.7	1.2	189-189/189	1089-1089/1089	354-354/354	677	800
	400/50/3	2	3	14/6	1.5	2.8	3.7	1.2	189-189/189	1089-1089/1089	354-354/354	468/256	600/400
350	400/50/3	1	4	24	1.5	2.8	3.7	1.2	160-160/ 160-160	1089-1089/ 1089-1089	354-354/ 354-354	755	800
	400/50/3	2	4	12/12	1.5	2.8	3.7	1.2	160-160/ 160-160	1089-1089/ 1089-1089	354-354/ 354-354	397/397	500/500
375	400/50/3	1	4	26	1.5	2.8	3.7	1.59	189-189/ 160-160	1089-1089/ 1089-1089	354-354/ 354-354	826	1000
	400/50/3	2	4	14/12	1.5	2.8	3.7	1.59	189-189/ 160-160	1089-1089/ 1089-1089	354-354/ 354-354	468/397	600/500
400	400/50/3	1	4	28	1.5	2.8	3.7	1.59	189-189/ 189-189	1089-1089/ 1089-1089	354-354/ 354-354	889	1000
	400/50/3	2	4	14/14	1.5	2.8	3.7	1.59	189-189/ 189-189	1089-1089/ 1089-1089	354-354/ 354-354	468/468	600/600

Notes:

1. Voltage Utilization Range: +/- 10% of rated voltage. Rated voltage (use range): 400 volt (360-440)
2. As standard, 140-200 ton units have a single point power connection. Optional dual point power connections are available. As standard, 250-400 ton units have dual point power connections. Optional single point power connections are available on 400V/50 Hz units.
3. Control VA includes operational controls only. It does not include evaporator heaters. A separate 220/50/1, 15 amp customer provided power connection is required to power the evaporator heaters (1640 watts).
4. RLA - Rated Load Amps
5. XLRA - Locked Rotor Amps - based on full winding (x-line) start units). YLRA for wye-delta starters is ~1/3 of LRA of x-line units.
6. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of all other loads.
7. Max fuse or MOPD = 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA, plus the sum of the condenser fan FLA. (Use FLA per circuit, NOT FLA for the entire unit).
8. Local codes may take precedence.
9. All ambient means standard, low, high and wide ambient options.

Electrical Data

Table 12. High efficiency — high and wide ambient options

Unit Size	Rated Voltage[1]	# Power Conn[2]	# Comp	# Fan Ckt1 / Ckt2	Fan kW	Fan FLA	VFD Input	Cntrl kVA[3]	RLA[4] Ckt1/Ckt2	XLRA[5] Ckt1/Ckt2	YLRA[5] Ckt1/Ckt2	MCA[6] Ckt1 / Ckt2	MOP[7] Ckt1 / Ckt2
120	400/50/3	1	2	8	1.5	2.8	3.7	0.83	118/118	796/796	259/259	292	400
	400/50/3	2	2	4/4	1.5	2.8	3.7	0.83	118/118	796/796	259/259	162/160	250/250
130	400/50/3	1	2	9	1.5	2.8	3.7	0.83	138/118	896/796	291/259	320	450
	400/50/3	2	2	5/4	1.5	2.8	3.7	0.83	138/118	896/796	291/259	189/160	300/250
140	400/50/3	1	2	10	1.5	2.8	3.7	0.83	138/138	896/896	291/291	342	450
	400/50/3	2	2	5/5	1.5	2.8	3.7	0.83	138/138	896/896	291/291	189/187	300/300
155	400/50/3	1	2	11	1.5	2.8	3.7	0.83	168/138	1089/896	354/291	383	500
	400/50/3	2	2	6/5	1.5	2.8	3.7	0.83	168/138	1089/896	354/291	230/187	350/300
170	400/50/3	1	2	12	1.5	2.8	3.7	0.83	168/168	1089/1089	354/354	415	500
	400/50/3	2	2	6/6	1.5	2.8	3.7	0.83	168/168	1089/1089	354/354	230/228	350/350
185	400/50/3	1	2	13	1.5	2.8	3.7	0.83	198/168	1089/1089	354/354	456	600
	400/50/3	2	2	7/6	1.5	2.8	3.7	0.83	198/168	1089/1089	354/354	270/228	450/350
200	400/50/3	1	2	14	1.5	2.8	3.7	0.83	198/198	1089/1089	354/354	489	600
	400/50/3	2	2	7/7	1.5	2.8	3.7	0.83	198/198	1089/1089	354/354	270/268	450/450
250	400/50/3	1	3	16	1.5	2.8	3.7	1.2	138-138/198	896-896/1089	291-291/354	575	700
	400/50/3	2	3	10/6	1.5	2.8	3.7	1.2	138-138/198	896-896/1089	291-291/354	342/267	450/450
275	400/50/3	1	3	18	1.5	2.8	3.7	1.2	168-168/198	1089-1089/1089	354-354/354	642	800
	400/50/3	2	3	12/6	1.5	2.8	3.7	1.2	168-168/198	1089-1089/1089	354-354/354	416/267	500/450
300	400/50/3	1	3	20	1.5	2.8	3.7	1.2	198-198/198	1089-1089/1089	354-354/354	706	800
	400/50/3	2	3	14/6	1.5	2.8	3.7	1.2	198-198/198	1089-1089/1089	354-354/354	489/267	600/450
350	400/50/3	1	4	24	1.5	2.8	3.7	1.59	168-168/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	789	800
	400/50/3	2	4	12/12	1.5	2.8	3.7	1.59	168-168/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	415/415	500/500
375	400/50/3	1	4	26	1.5	2.8	3.7	1.59	198-198/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	862	1000
	400/50/3	2	4	14/12	1.5	2.8	3.7	1.59	198-198/ 168-168	1089-1089/ 1089-1089	354-354/ 354-354	489/415	600/500
400	400/50/3	1	4	28	1.5	2.8	3.7	1.59	198-198/ 198-198	1089-1089/ 1089-1089	354-354/ 354-354	928	1000
	400/50/3	2	4	14/14	1.5	2.8	3.7	1.59	198-198/ 198-198	1089-1089/ 1089-1089	354-354/ 354-354	489/489	600/600

Notes:

1. Voltage Utilization Range: +/- 10% of rated voltage. Rated voltage (use range): 400 volt (360-440)
2. As standard, 140-200 ton units have a single point power connection. Optional dual point power connections are available. As standard, 250-400 ton units have dual point power connections. Optional single point power connections are available on 400V/50 Hz units.
3. Control VA includes operational controls only. It does not include evaporator heaters. A separate 220/50/1, 15 amp customer provided power connection is required to power the evaporator heaters (1640 watts).
4. RLA - Rated Load Amps
5. XLRA - Locked Rotor Amps - based on full winding (x-line) start units). YLRA for wye-delta starters is ~1/3 of LRA of x-line units.
6. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of all other loads.
7. Max fuse or MOPD = 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA, plus the sum of the condenser fan FLA. (Use FLA per circuit, NOT FLA for the entire unit).
8. Local codes may take precedence.
9. All ambient means standard, low, high and wide ambient options.

Table 13. Customer wire selection — standard efficiency

Unit Size	Volt	Single point power			Dual point power - Ckt 1			Dual point power - Ckt 2		
		Term	Disc	Circuit Breaker	Term	Disc	Circuit Breaker	Term	Disc	Circuit Breaker
140	400	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
155	400	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 5 00 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
170	400	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
185	400	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
200	400	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
250	400	(2) 4 AWG - 500 MCM	(3) 3/0 - 500 MCM	(3) 3/0 - 500 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
275	400	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
300	400	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
350	400	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
375	400	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	(4) 2 AWG - 600 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
400	400	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM

1. Non-fused unit disconnect and circuit breaker are optional.
2. Copper wire only, based on nameplate minimum circuit ampacity (MCA).
3. Circuit breaker sizes are for factory mounted only.
4. n/a - not available

Table 14. Customer wire selection — high efficiency

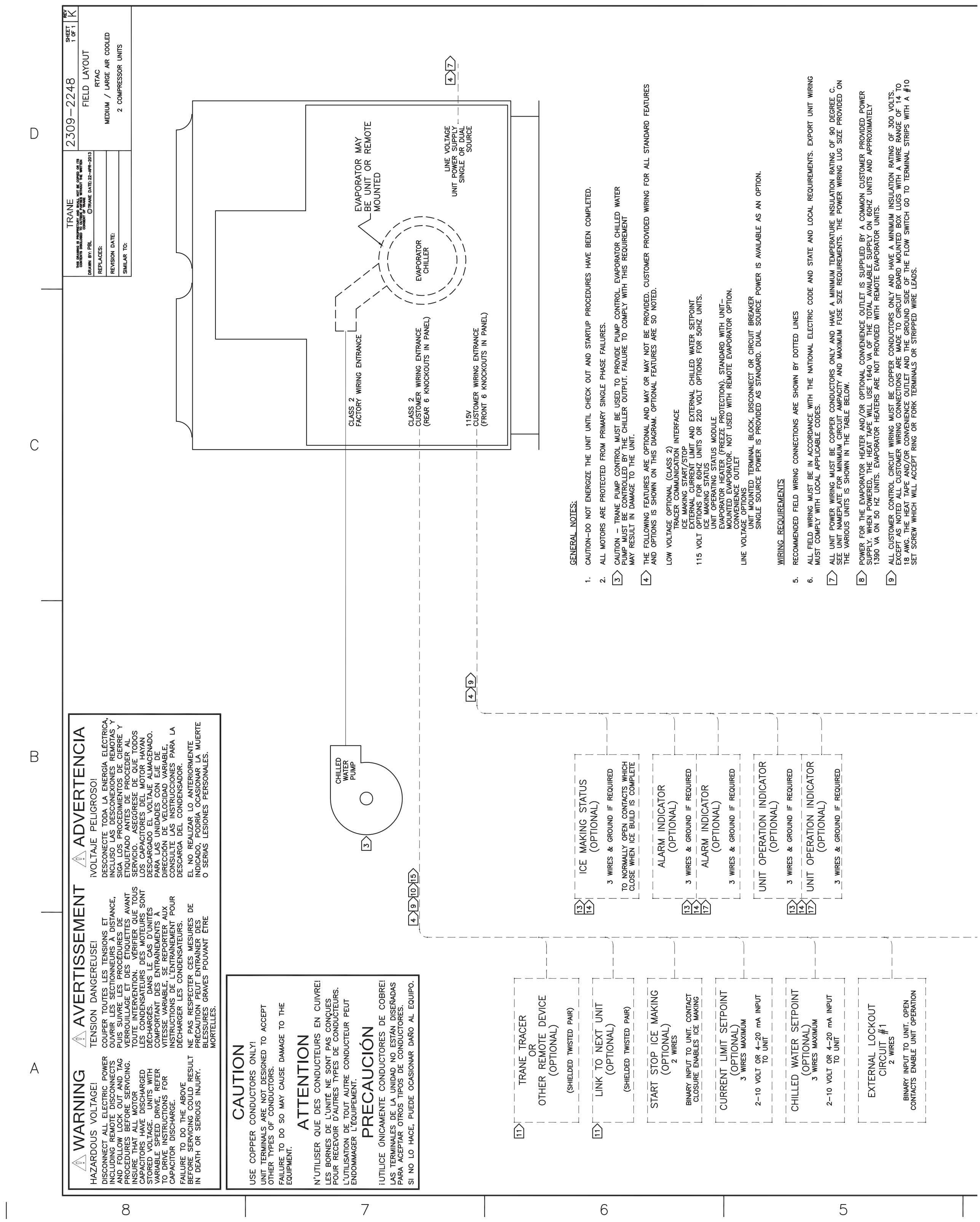
Unit Size	Volt	Ambient	Single point power Term	Single point power Disc	Single point power Circuit Breaker	Dual point power - Ckt 1 Term	Dual point power - Ckt 1 Disc	Dual point power - Ckt 1 Circuit Breaker	Dual point power - Ckt 2 Term	Dual point power - Ckt 2 Disc	Dual point power - Ckt 2 Circuit Breaker
120	400	All	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	3/0- 350MCM	3/0- 350MCM	4 AWG - 500 MCM	3/0- 350MCM	3/0- 350MCM
130	400	Std, Low	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	3/0- 350MCM	3/0- 350MCM	4 AWG - 500 MCM	3/0- 350MCM	3/0- 350MCM
	400	High, Wide	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	3/0- 350MCM	3/0- 350MCM
140	400	All	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
155	400	All	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
170	400	Std, Low	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
	400	High, Wide	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 0 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
185	400	Std, Low	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
	400	High, Wide	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
200	400	Std, Low	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
	400	High, Wide	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 5 00 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
250	400	Std, Low	(2) 4 AWG - 500 MCM	(3) 3/0 - 500 MCM	(3) 3/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
	400	High, Wide	(2) 4 AWG - 500 MCM	(3) 3/0 - 500 MCM	(3) 3/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
275	400	All	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM

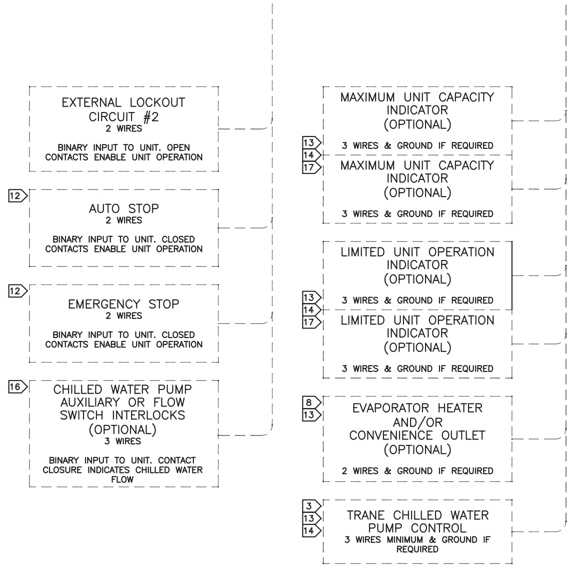
Table 14. Customer wire selection — high efficiency (continued)

			Single point power			Dual point power - Ckt 1			Dual point power - Ckt 2		
Unit Size	Volt	Ambient	Term	Disc	Circuit Breaker	Term	Disc	Circuit Breaker	Term	Disc	Circuit Breaker
300	400	All	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	4 AWG - 500 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM	(1) 1 AWG - 600 MCM or (2) 1 AWG - 250 MCM
350	400	All	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
375	400B	All	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	(4) 2 AWG - 600 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM
400	400	All	n/a		(4) 2 AWG - 600 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM	(2) 4 AWG - 500 MCM	(2) 2/0 - 500 MCM	(2) 2/0 - 500 MCM

1. Non-fused unit disconnect and circuit breaker are optional.
2. Copper wire only, based on nameplate minimum circuit ampacity (MCA).
3. Circuit breaker sizes are for factory mounted only.
4. n/a - not available

Electrical Connection





10 DO NOT RUN LOW VOLTAGE CONTROL WIRING (30 VOLTS OR LESS) IN CONDUIT WITH 110 VOLT OR HIGHER WIRING. DO NOT EXCEED THE FOLLOWING MAXIMUM RUN LENGTHS FOR A GIVEN SIZE: 14 AWG, 5000 FT; 16 AWG, 2000 FT; 18 AWG, 1000FT

11 SHIELDED TWISTED PAIR LEADS ARE REQUIRED FOR CONNECTIONS TO THE COMMUNICATIONS INTERFACE MODULE (1U8 OR 1U24). THE SHIELD SHOULD BE GROUNDED AT THE RTAC CONTROL PANEL END.

12 THE CONTACTS FOR THESE FEATURES ARE JUMPERED AT THE FACTORY BY JUMPERS W1 & W2 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED REMOVE THE NOTED JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.

13 FIELD PROVIDED 115 VOLT 60HZ OR 220 VOLT 50HZ CONTROL POWER SUPPLIES ARE REQUIRED. THE MAX FUSE SIZE FOR EVAPORATOR HEATER AND CONVENIENCE OUTLET IS 20 AMPS ON 115 VOLT 60HZ PRODUCTS AND 15 AMPS ON 220 VOLT 50 HZ PRODUCTS. THE MAX FUSE SIZE FOR ALL OTHER FIELD PROVIDED CIRCUITS IS 15 AMPS. GROUND ALL CUSTOMER PROVIDED POWER SUPPLIES AS REQUIRED BY CODE. GREEN GROUND SCREWS ARE PROVIDED IN UNIT CONTROL PANEL.

CONTACT RATINGS AND REQUIREMENTS

14 UNIT PROVIDED DRY CONTACTS FOR THE EVAPORATOR PUMP CONTROL, THE UNIT OPERATING STATUS RELAYS AND ICE MAKING STATUS RELAY ARE RATED FOR 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, OR 1/3 HP, 7.2 FLA AT 120 VOLTS 60 HZ, CONTACTS ARE RATED FOR 5 AMPS GENERAL PURPOSE DUTY AT 240 VOLTS.

15 CUSTOMER SUPPLIED CONTACTS FOR ALL CLASS 2 CONNECTIONS MUST BE COMPATABLE WITH DRY CIRCUIT 24 VOLTS DC FOR A 12 mA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS ARE RECOMMENDED.

16 FLOW SWITCH & INTERLOCK CONTACTS MUST BE ACCEPTABLE FOR USE IN A 24 VOLT 12 mA CIRCUIT.

17 THE FIELD PROVIDED INDICATORS MAY BE RELAYS, LIGHTS OR AUDIBLE DEVICES. FOUR DUPLICATE INDICATOR FUNCTIONS ARE SHOWN. THE DUPLICATE FUNCTIONS MAY BE CONNECTED TO EITHER OR BOTH OF THE NORMALLY OPEN OR NORMALLY CLOSED RELAY CONTACTS OF EACH OF THE 4 SPDT RELAYS ON THE OPTIONAL UNIT OPERATING STATUS MODULE.

THE FUNCTIONS OF THE OPERATING STATUS MODULE RELAYS ARE PROGRAMABLE. SEE IOM FOR DETAILS. DEFAULT FUNCTIONS ARE SHOWN.

THE NORMALLY OPEN CONTACTS ON EACH RELAY OPERATE AS FOLLOWS:
CONTACTS TO THE ALARM INDICATOR CLOSE ON A UNIT MALFUNCTION.
CONTACTS TH THE UNIT OPERATION INDICATOR CLOSE WHEN ANY COMPRESSOR IS RUNNING.
CONTACTS TO THE MAX UNIT CAPACITY INDICATOR CLOSE WHEN ALL UNIT COMPRESSORS ARE FULLY LOADED.
CONTACTS TO THE LIMITED UNIT OPERATION INDICATOR CLOSE IF NORMAL UNIT OPERATION IS RESTRICTED BY SOME OPERATING PARAMETER.

REPLACEMENT FUSE SIZES

FUSE PROTECT FUNCTION	UNIT SIZE	UNIT VOLTAGE/HZ	DESIGNATION	VOLTS	CLASS	AMPS
CONDENSER FANS	120 TO 250	ALL	1F1 THRU 1F12	600	CC	30
CONTROL POWER TRANSFORMER PRIMARY	ALL	200/60	1F13,1F14	600	CC	10
		230/60				8
		380/60				5
		460/60				5
		575/60				4
		400/50				5
CONTROL POWER TRANSFORMER 115 VOLT SEC.	ALL	ALL	1F15	600	CC	10
CONTROL POWER TRANSFORMER 24 VOLT SEC.			1F16 & 1F17	600	CC	6
INVERTER DRIVE AND OR INVERTER TRANSFORMER PRI.	ALL	ALL BUT 575/60	1F18 THRU 1F23	600	CC	30
		575/60				6.25

WIRE SIZE RANGE FOR FACTORY PROVIDED LUGS FOR CUSTOMER POWER WIRING CONNECTIONS

CIRCUIT BREAKER OPTION

VOLTAGE	SINGLE SOURCE POWER ELECTRICAL CIRCUIT 1 & 2: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	ELECTRICAL CIRCUIT 1 DUAL SOURCE POWER: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	ELECTRICAL CIRCUIT 2 DUAL SOURCE POWER: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE
200/60/3	140 SE/HE/XE;	THREE 1/0 AWG – 500 MCM	140 SE/HE/XE; 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155 SE/HE/XE; 170, 185, 200, 225 SE/HE;	TWO 3/0 AWG – 500 MCM
	155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	FOUR 250 MCM – 500 MCM	155, 170, 185, 200 XE; 225, 250 SE/HE;	THREE 1/0 AWG – 500 MCM	170, 185, 200 XE; 250 SE/HE;	THREE 1/0 AWG – 500 MCM
230/60/3	140, 155 SE/HE/XE; 170XE	THREE 1/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185 SE/HE/XE; 200, 225 SE/HE;	TWO 3/0 AWG – 500 MCM
	170 SE/HE; 185, 200 SE/HE/XE; 225, 250 SE/HE;	FOUR 250 MCM – 500 MCM	185, 200 XE; 225, 250 SE/HE;	THREE 1/0 AWG – 500 MCM	200 XE; 250 SE/HE;	THREE 1/0 AWG – 500 MCM
380/60/3	140, 155, 170, 185 SE/HE/XE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM
	200 SE/HE/XE; 225, 250 SE/HE;	THREE 1/0 AWG – 500 MCM				
460/60/3	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM
575/60/3	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM
400/50/3	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM

DISCONNECT SWITCH OPTION

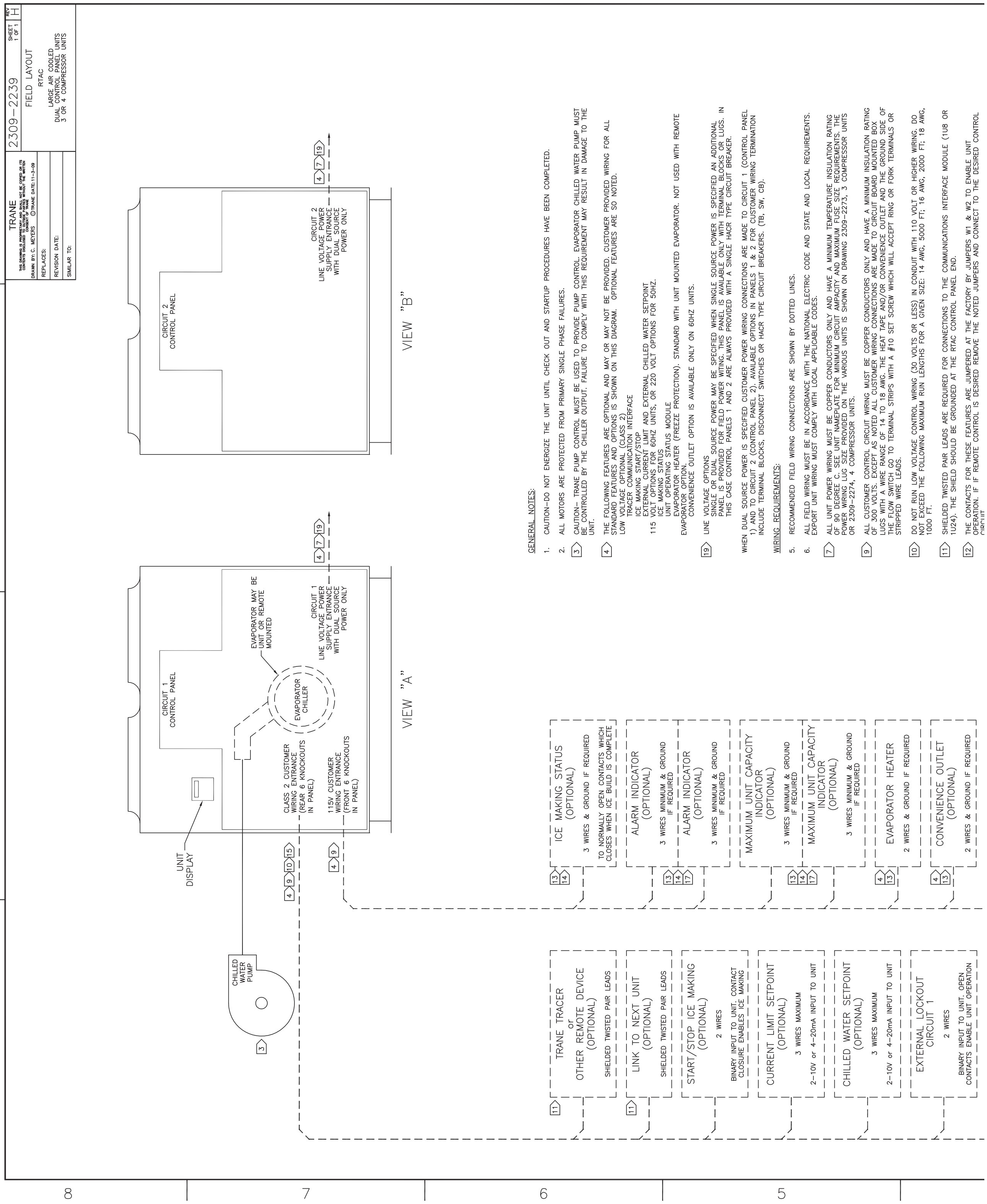
VOLTAGE	SINGLE SOURCE POWER ELECTRICAL CIRCUIT 1 & 2: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	ELECTRICAL CIRCUIT 1 DUAL SOURCE POWER: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	ELECTRICAL CIRCUIT 2 DUAL SOURCE POWER: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE
200/60/3	140 SE/HE/XE; 155 SE/HE;	THREE 1/0 AWG – 500 MCM	140 SE/HE/XE; 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155 SE/HE/XE; 170, 185, 200, 225 SE/HE;	TWO 3/0 AWG – 500 MCM
	155 XE; 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	FOUR 250 MCM – 500 MCM	155, 170, 185, 200 XE; 225, 250 SE/HE;	THREE 1/0 AWG – 500 MCM	170, 185, 200 XE; 250 SE/HE;	THREE 1/0 AWG – 500 MCM
230/60/3	140, 155, 170 SE/HE/XE;	THREE 1/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200, 225 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185 SE/HE/XE; 200, 225 SE/HE;	TWO 3/0 AWG – 500 MCM
	185, 200 SE/HE/XE; 225, 250 SE/HE;	FOUR 250 MCM – 500 MCM	185, 200 XE; 250 SE/HE;	THREE 1/0 AWG – 500 MCM	200 XE, 250 SE/HE;	THREE 1/0 AWG – 500 MCM
380/60/3	140, 155, 170, 185 SE/HE/XE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM
	200 SE/HE/XE; 225, 250 SE/HE;	THREE 1/0 AWG – 500 MCM				
460/60/3	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM
575/60/3	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 3/0 AWG – 500 MCM
400/50/3	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM

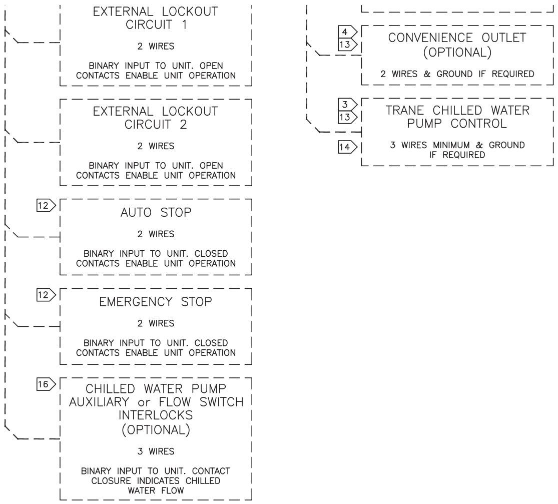
TERMINAL BLOCK OR LUG OPTION

VOLTAGE	SINGLE SOURCE POWER ELECTRICAL CIRCUIT 1 & 2: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	ELECTRICAL CIRCUIT 1 DUAL SOURCE POWER: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	ELECTRICAL CIRCUIT 2 DUAL SOURCE POWER: UNIT SIZE (TONS) & EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE
200/60/3	140 SE/HE;	THREE 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200, 225 SE/HE;	TWO 2 AWG – 600 MCM
			140, 155, 170 XE; 225, 250 SE/HE;	THREE 2 AWG – 600 MCM	140, 155, 170, 185 XE; 250 SE/HE;	THREE 2 AWG – 600 MCM
	140XE; 155, 170, 185, 200 SE/HE/XE; 225, 250SE/HE;	FOUR 2 AWG – 600 MCM	185, 200 XE;	FOUR 2 AWG – 600 MCM	200 XE;	FOUR 2 AWG – 600 MCM
230/60/3	140, 155 SE/HE;	THREE 2 AWG – 600 MCM	140 SE/HE/XE; 155, 170, 185, 200, 225 SE/HE;	TWO 2 AWG – 600 MCM	140, 155 SE/HE/XE; 170, 185, 200, 225 SE/HE;	TWO 2 AWG – 600 MCM
	140, 155XE; 170, 185, 200 SE/HE/XE; 225, 250SE/HE;	FOUR 2 AWG – 600 MCM	185, 200 XE;	FOUR 2 AWG – 600 MCM	200 XE;	FOUR 2 AWG – 600 MCM
			155, 170 XE; 250 SE/HE;	THREE 2 AWG – 600 MCM	170, 185 XE; 250 SE/HE;	THREE 2 AWG – 600 MCM
380/60/3	140, 155, 170 SE/HE/XE; 185 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM
	185 XE; 200 SE/HE/XE; 225, 250 SE/HE;	THREE 2 AWG – 600 MCM				
460/60/3	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM
575/60/3	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE/XE; 225, 250 SE/HE;	TWO 2 AWG – 600 MCM
400/50/3	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM

SE = STANDARD EFFICIENCY UNITS / HE = HIGH EFFICIENCY UNITS / XE = EXTRA EFFICIENCY UNITS

Electrical Connection





NOT EXCEED THE FOLLOWING MAXIMUM RUN LENGTHS FOR A GIVEN SIZE: 14 AWG, 5000 FT; 16 AWG, 2000 FT; 18 AWG, 1000 FT.

11. SHIELDED TWISTED PAIR LEADS ARE REQUIRED FOR CONNECTIONS TO THE COMMUNICATIONS INTERFACE MODULE (1U8 OR 1U24). THE SHIELD SHOULD BE GROUNDED AT THE RTAC CONTROL PANEL END.

12. THE CONTACTS FOR THESE FEATURES ARE JUMPERED AT THE FACTORY BY JUMPERS W1 & W2 TO ENABLE UNIT OPERATION. IF IF REMOTE CONTROL IS DESIRED REMOVE THE NOTED JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.

13. FIELD PROVIDED 115 VOLT 60HZ OR 220 VOLT 50HZ CONTROL POWER SUPPLIES ARE REQUIRED. THE MAX FUSE SIZE FOR EVAPORATOR HEATER IS 20 AMPS ON 115 VOLT 60HZ PRODUCTS AND 15 AMPS ON 220 VOLT 50 HZ PRODUCTS. THE MAX FUSE SIZE FOR ALL OTHER FIELD PROVIDED CIRCUITS IS 15 AMPS. GROUND ALL CUSTOMER PROVIDED POWER SUPPLIES AS REQUIRED BY CODE. GREEN GROUND SCREWS ARE PROVIDED IN UNIT CONTROL PANEL.

CONTACT RATINGS AND REQUIREMENTS:

14. UNIT PROVIDED DRY CONTACTS FOR THE EVAPORATOR PUMP CONTROL, THE UNIT OPERATING STATUS RELAYS AND ICE MAKING STATUS RELAY ARE RATED FOR 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, OR 1/3 HP, 7.2 FLA AT 120 VOLTS 60 HZ, CONTACTS ARE RATED FOR 5 AMPS GENERAL PURPOSE DUTY AT 240 VOLTS.

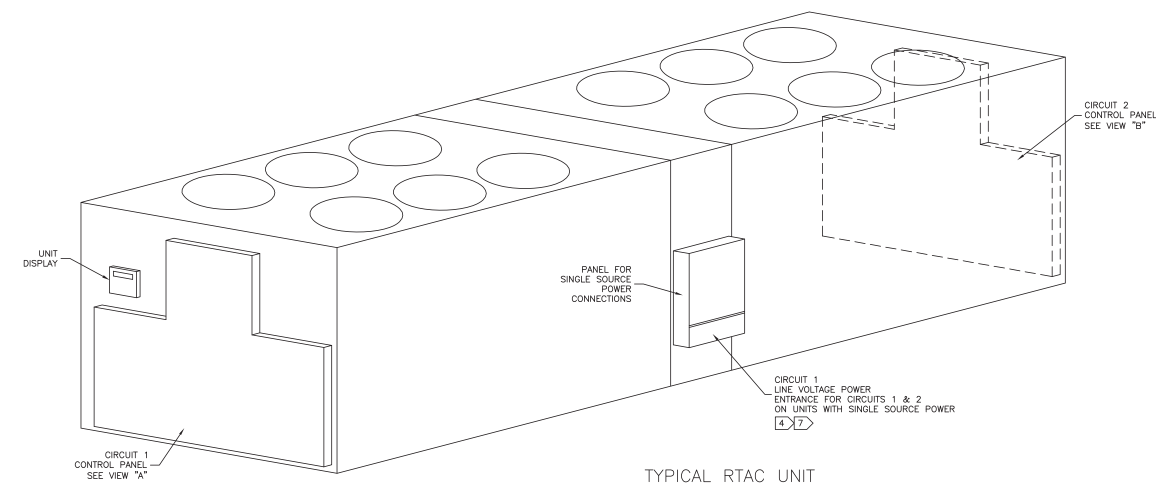
15. CUSTOMER SUPPLIED CONTACTS FOR ALL CLASS 2 CONNECTIONS MUST BE COMPATABLE WITH DRY CIRCUIT 24 VOLTS DC FOR A 12 MA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS ARE RECOMMENDED.

16. FLOW SWITCH & INTERLOCK CONTACTS MUST BE ACCEPTABLE FOR USE IN A 24 VOLT 12 mA CIRCUIT OR A 220 VOLT 2 mA CIRCUIT.

17. THE FIELD PROVIDED INDICATORS MAY BE RELAYS, LIGHTS OR AUDIBLE DEVICES. FOUR DUPLICATE INDICATOR FUNCTIONS ARE SHOWN. THE DUPLICATE FUNCTIONS MAY BE CONNECTED TO EITHER OR BOTH OF THE NORMALLY OPEN OR NORMALLY CLOSED RELAY CONTACTS OF EACH OF THE 4 SPDT RELAYS ON THE OPTIONAL UNIT OPERATING STATUS MODULE.

THE FUNCTIONS OF THE OPERATING STATUS MODULE RELAYS ARE PROGRAMABLE. SEE IOM FOR DETAILS. DEFAULT FUNCTIONS ARE SHOWN.

THE NORMALLY OPEN CONTACTS ON EACH RELAY OPERATE AS FOLLOWS:
- CONTACTS TO THE ALARM INDICATOR CLOSE ON A UNIT MALFUNCTION.
- CONTACTS TO THE UNIT OPERATION INDICATOR CLOSE WHEN ANY COMPRESSOR IS RUNNING.
- CONTACTS TO THE MAX UNIT CAPACITY INDICATOR CLOSE WHEN ALL UNIT COMPRESSORS ARE FULLY LOADED.
- CONTACTS TO THE LIMITED UNIT OPERATION INDICATOR CLOSE IF NORMAL UNIT OPERATION IS RESTRICTED BY SOME OPERATING PARAMETER.

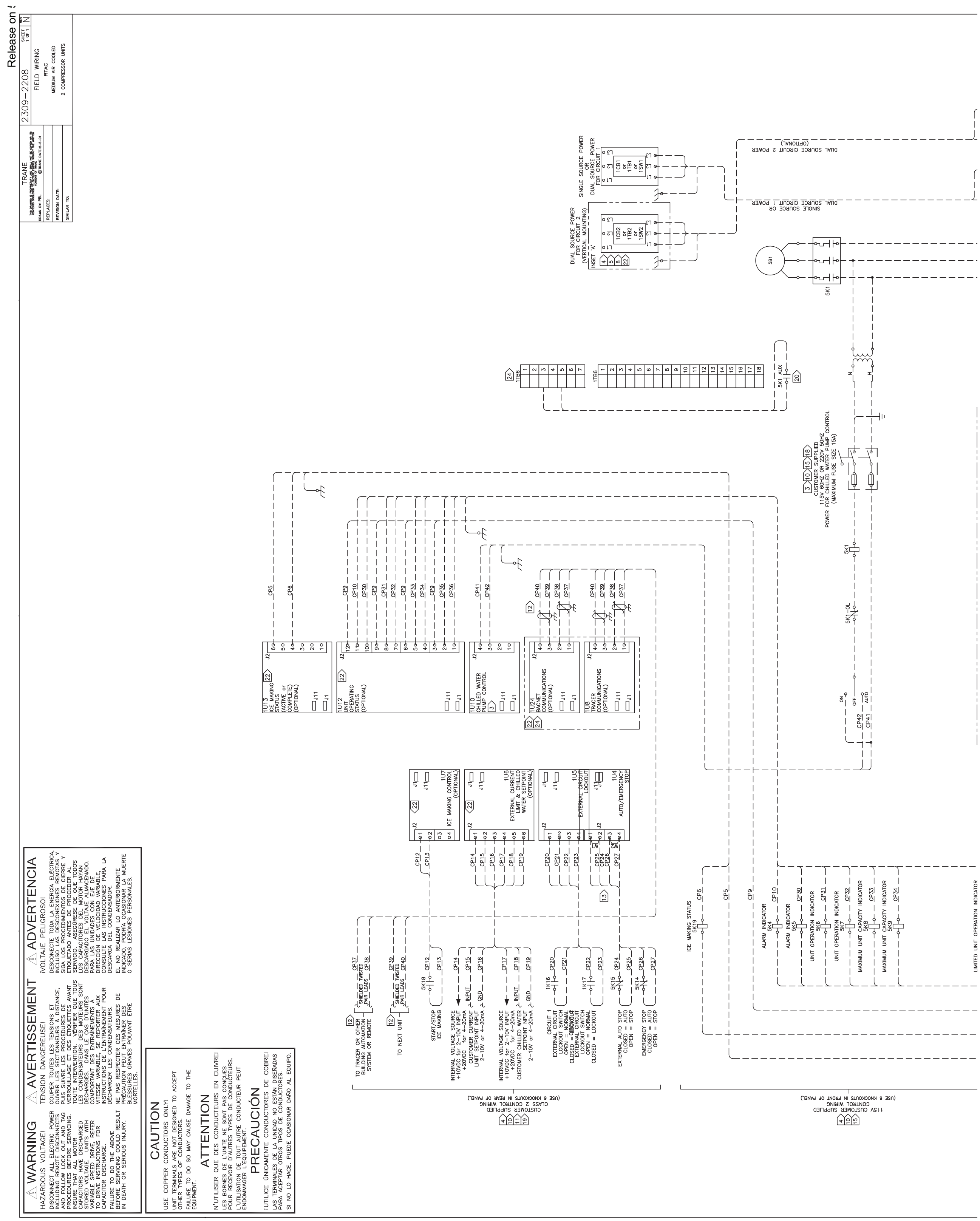


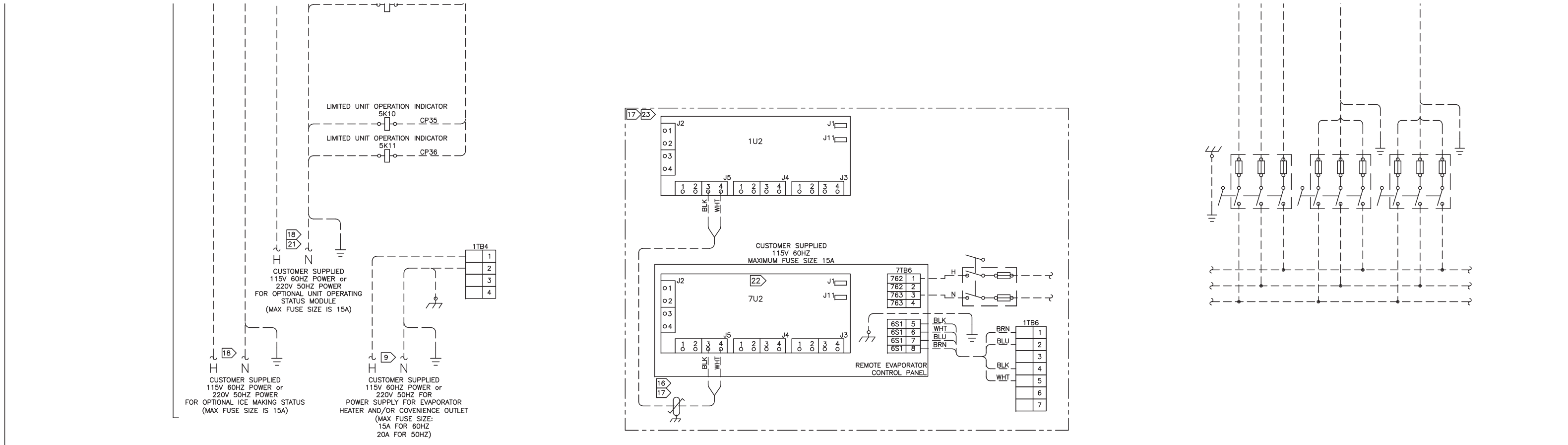
TYPICAL RTAC UNIT

4 3 2 1

39 PM

Electrical Connection





GENERAL NOTES:

1. CAUTION—DO NOT ENERGIZE THE UNIT UNTIL CHECK OUT AND STARTUP PROCEDURES HAVE BEEN COMPLETED.

2. ALL MOTORS ARE PROTECTED FROM PRIMARY SINGLE PHASE FAILURES.

3. CAUTION—TRANE PUMP CONTROL MUST BE USED TO PROVIDE PUMP CONTROL. EVAPORATOR CHILLED WATER PUMP MUST BE CONTROLLED BY THE CHILLER OUTPUT. FAILURE TO COMPLY WITH THIS REQUIREMENT MAY RESULT IN DAMAGE TO THE UNIT.

4. THE FOLLOWING FEATURES ARE OPTIONAL AND MAY OR MAY NOT BE PROVIDED. CUSTOMER PROVIDED WIRING FOR ALL STANDARD FEATURES AND OPTIONS IS SHOWN ON THIS DIAGRAM. OPTIONAL FEATURES ARE SO NOTED.

   LOW VOLTAGE OPTIONS (CLASS 2)
   - TRACER COMMUNICATION INTERFACE OR OTHER BUILDING AUTOMATION SYSTEM COMMUNICATION INTERFACE
   - ICE MAKING START/STOP
   - EXTERNAL CURENT LIMIT AND EXTERNAL CHILLED WATER SETPOINT

   115 VOLT OPTIONS FOR 60HZ UNITS OR 220 VOLT OPTIONS FOR 50HZ UNITS.
   - ICE MAKING STATUS
   - UNIT OPERATING STATUS MODULE
   - EVAPORATOR HEATER (FREEZE PROTECTION). STANDARD WITH UNIT-MOUNTED EVAPORATOR. NOT USED WITH REMOTE EVAPORATOR OPTION.

   LINE VOLTAGE OPTIONS
   - UNIT MOUNTED TERMINAL BLOCK, DISCONNECT SWITCH OR HACR CIRCUIT BREAKER (TB, SW OR CB)

5. SINGLE SOURCE POWER IS PROVIDED AS STANDARD. DUAL SOURCE POWER IS AVAILABLE AS AN OPTION. COMPONENTS 1CB2, 1TB2 & 1SW2 ARE PROVIDED ONLY WITH THE DUAL SOURCE POWER OPTION. (INSET A) REQUIRED PHASING IS SHOWN.

WIRING REQUIREMENTS

6. RECOMMENDED FIELD WIRING CONNECTIONS ARE SHOWN BY DOTTED LINES

7. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND STATE AND LOCAL REQUIREMENTS. EXPORT UNIT WIRING MUST COMPLY WITH LOCAL APPLICABLE CODES.

8. ALL UNIT POWER WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM TEMPERATURE INSULATION RATING OF 90 DEGREE C. SEE UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM FUSE SIZE REQUIREMENTS. THE POWER WIRING LUG SIZE PROVIDED ON THE VARIOUS UNITS IS SHOWN IN THE ADJACENT TABLE.

9. POWER FOR THE EVAPORATOR HEATER AND/OR OPTIONAL CONVENIENCE OUTLET IS SUPPLIED BY A COMMON CUSTOMER PROVIDED POWER SUPPLY. WHEN POWERED, THE HEAT TAPE WILL USE 1640 VA OF THE TOTAL AVAILABLE SUPPLY ON 60 HZ UNITS AND APPROXIMATELY 1390 VA ON 50 HZ UNITS. EVAPORATOR HEATERS ARE NOT PROVIDED WITH REMOTE EVAPORATOR UNITS.

10. ALL CUSTOMER CONTROL CIRCUIT WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM INSULATION RATING OF 300 VOLTS. EXCEPT AS NOTED ALL CUSTOMER WIRING CONNECTIONS ARE MADE TO CIRCUIT BOARD MOUNTED BOX LUGS WITH A WIRE RANGE OF 14 TO 18 AWG. THE HEAT TAPE AND/OR CONVENIENCE OUTLET AND THE GROUND SIDE OF THE FLOW SWITCH GO TO TERMINAL STRIPS WITH A #10 SET SCREW WHICH WILL ACCEPT RING OR FORK TERMINALS OR STRIPPED WIRE LEADS.

11. DO NOT RUN LOW VOLTAGE CONTROL WIRING (30 VOLTS OR LESS) IN CONDUIT WITH 110 VOLT OR HIGHER WIRING. DO NOT EXCEED THE FOLLOWING MAXIMUM RUN LENGTHS FOR A GIVEN SIZE: 14 AWG, 5000 FT; 16 AWG, 2000 FT; 18 AWG, 1000 FT.

12. SHIELDED TWISTED PAIR LEADS ARE REQUIRED FOR CONNECTIONS TO THE COMMUNICATIONS INTERFACE MODULE (1U8). THE SHIELD SHOULD BE GROUNDED AT THE CHILLER CONTROL PANEL END.

13. THE CONTACTS FOR THESE FEATURES ARE JUMPERED AT THE FACTORY BY JUMPERS W1 & W2 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED REMOVE THE JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.

14. AS SHIPPED THE NORMAL 400 VOLT UNIT CONTROL POWER TRANSFORMERS ARE WIRED ON THE 400 VOLT TAP (H3). TRANSFORMER LEADS 126A & 126B SHOULD BE RECONNECTED TO THE APPROPRIATE TAP FOR THE 380 (H2) OR 415 (H4) VOLT POWER SUPPLIES.

15. GROUND ALL CUSTOMER PROVIDED 115 VOLT POWER SUPPLIES AS REQUIRED BY CODES. GREEN GROUND SCREWS ARE PROVIDED IN THE UNIT CONTROL PANEL.

16. COMMUNICATION LINK TO BE SHIELDED TWISTED PAIR LEADS. SHIELD TO BE GROUNDED ONLY AT THE MAIN UNIT CONTROL PANEL. THE LINK IS WIRED TO CIRCUIT BOARD MOUNTED BOX LUGS WITH A WIRE RANGE OF 14 TO 18 AWG. DO NOT RUN LOW VOLTAGE CONTROL WIRING (30 VOLTS OR LESS) IN CONDIUT WITH 110 VOLT OR HIGHER WIRING. DO NOT EXTEED THE FOLLOWING MAXIMUM RUN LENGTHS FOR A GIVEN SIZE: 14 AWG, 5000 FT; 16 AWG, 2000 FT; 18 AWG, 1000 FT.

17. ALL CUSTOMER CONTROL CIRCUIT WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM INSULATION RATING OF 300 VOLTS. 115 VOLT POWER SUPPLY CONNECTIONS ARE MADE TO A TERMINAL STRIP WHICH HAS A #10 SET SCREW WHICH WILL ACCEPT RING OR FORK TERMINALS OR STRIPPED LEADS.

CONTACT RATINGS AND REQUIREMENTS

18. UNIT PROVIDED DRY CONTACTS FOR THE EVAPORATOR PUMP CONTROL, THE UNIT OPERATING STATUS RELAYS & THE ICE MAKING STATUS RELAY (1U10, 1U12, & 1U13) ARE RATED FOR 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, OR 1/3 HP, 7.2 FLA AT 120 VOLTS 60 HZ. CONTACTS ARE RATED FOR 5 AMPS GENERAL PURPOSE DUTY AT 240 VOLTS. THE MAX FUSE SIZE FOR ANY OF THESE CIRCUITS IS 15 AMPS.

19. CUSTOMER SUPPLIED CONTACTS FOR ALL LOW VOLTAGE CONNECTIONS MUST BE COMPATABLE WITH DRY CIRCUIT 24 VOLTS DC FOR A 12 MA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS ARE RECOMMENDED.

20. FLOW SWITCH AND INTERLOCK CONTACTS MUST BE ACCEPTABLE FOR USE IN A 24 VOLT 12mA CIRCUIT. REMOVE JUMPER BETWEEN 1TB6—5 AND 1TB6—3 WHEN 5K1 AUX CONTACT IS USED.

21. THE FIELD PROVIDED INDICATORS MAY BE RELAYS (AS SHOWN), LIGHTS OR AUDIBLE DEVICES. FOUR DUPLICATE FUNCTIONS ARE SHOWN. THE DUPLICATE FUNCTIONS MAY BE CONNECTED TO EITHER OR BOTH OF THE NORMALLY OPEN OR NORMALLY CLOSED RELAY CONTACTS OF EACH OF THE 4 SPDT RELAYS ON THE OPTIONAL UNIT OPERATING STATUS MODULE.

22. OPTIONAL COMPONENT — CHECK MODEL NUMBER TO DETERMINE IF USED OR NOT.

23. WIRING FOR CUSTOMER SUPPLIED REMOTE EVAPORATOR.

24. THE FUNCTIONS OF THE OPERATING STATUS MODULE RELAYS ARE PROGRAMABLE. DEFAULT FUNCTIONS ARE SHOWN. SEE IOM FOR DETAILS.

REPLACEMENT FUSE SIZES

FUSE PROTECT FUNCTION	UNIT SIZE	UNIT VOLTAGE/HZ	DESIGNATION	VOLTS	CLASS	AMPS
CONDENSER FANS	120 TO 250	ALL	1F1 THRU 1F12	600	CC	30
CONTROL POWER TRANSFORMER PRIMARY	ALL	200/60	1F13,1F14	600	CC	10
		230/60				8
		380/60				5
		460/60				5
		575/60				4
		400/50				5
CONTROL POWER TRANSFORMER 115 VOLT SEC.	ALL	ALL	1F15	600	CC	10
CONTROL POWER TRANSFORMER 24 VOLT SEC.			1F16 & 1F17			6
INVERTER DRIVE AND OR INVERTER TRANSFORMER PRI.	ALL	ALL BUT 575/60	1F18 THRU 1F23	600	CC	30
		575/60				6.25

WIRE SIZE RANGE FOR FACTORY PROVIDED LUGS FOR CUSTOMER POWER WIRING CONNECTIONS

CIRCUIT BREAKER OPTION

	SINGLE SOURCE POWER ELECTRICAL CIRCUIT 1 & 2		ELECTRICAL CIRCUIT 1 DUAL SOURCE POWER		ELECTRICAL CIRCUIT 2 DUAL SOURCE POWER	
VOLTAGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE
200/60/3	140 SE/HE/XE;	THREE 1/0 AWG – 500 MCM	140 SE/HE/XE; 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155 SE/HE/XE; 170, 185, 200 SE/HE; 225 SE;	TWO 3/0 AWG – 500 MCM
	155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	FOUR 250 MCM – 500 MCM	155, 170 XE; 225, 250 SE;	THREE 1/0 AWG – 500 MCM	170 XE, 250 SE;	THREE 1/0 AWG – 500 MCM
230/60/3	140, 155 SE/HE/XE; 170 XE;	THREE 1/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225 SE;	TWO 3/0 AWG – 500 MCM
	170, 185, 200 SE/HE; 225, 250 SE;	FOUR 250 MCM – 500 MCM	225, 250 SE;	THREE 1/0 AWG – 500 MCM	250 SE;	THREE 1/0 AWG – 500 MCM
380/60/3	140, 155, 170 SE/HE/XE; 185 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM
	200 SE/HE; 225, 250 SE;	THREE 1/0 AWG – 500 MCM				
460/60/3	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM
575/60/3	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM
400/50/3	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM

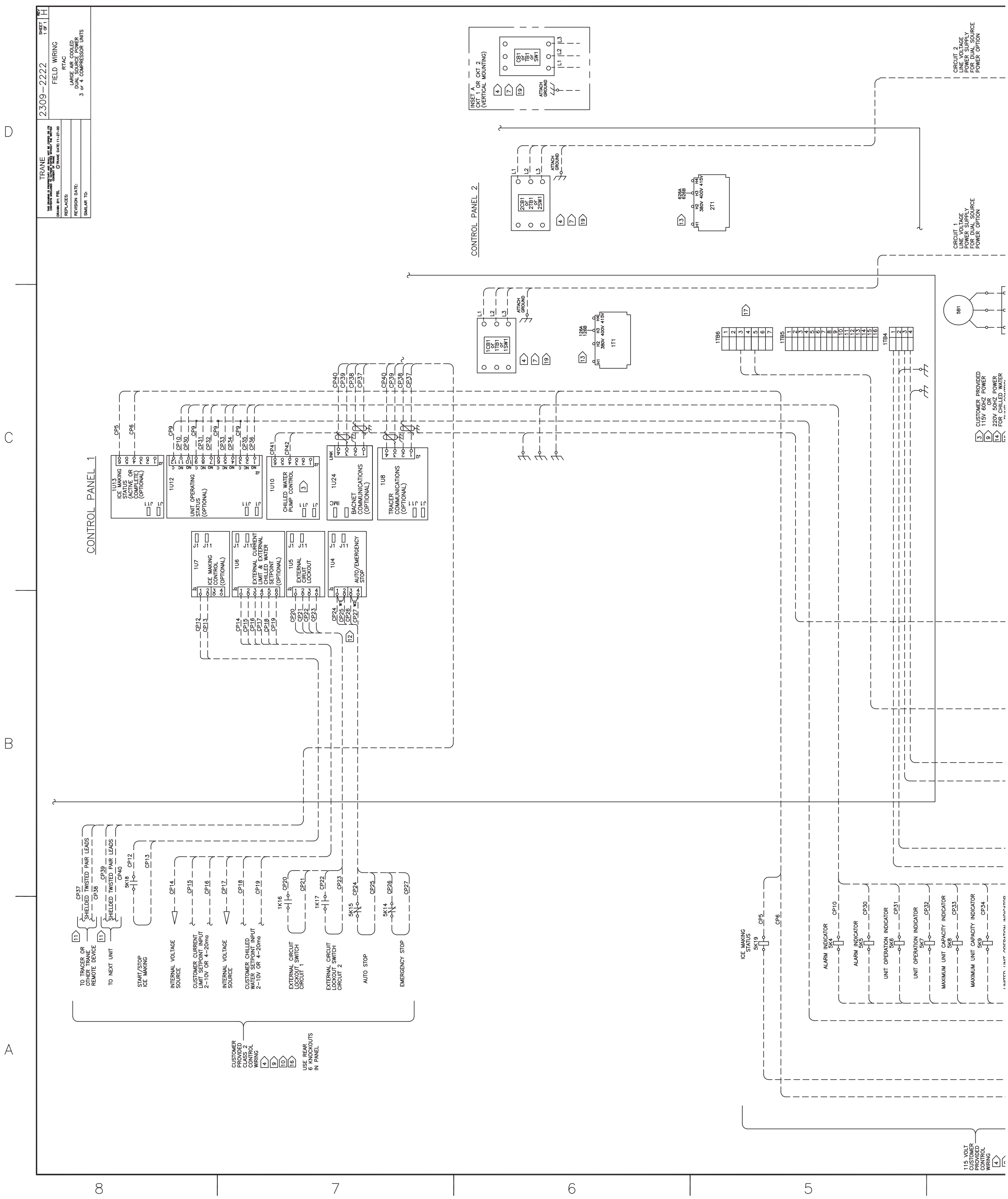
DISCONNECT SWITCH OPTION

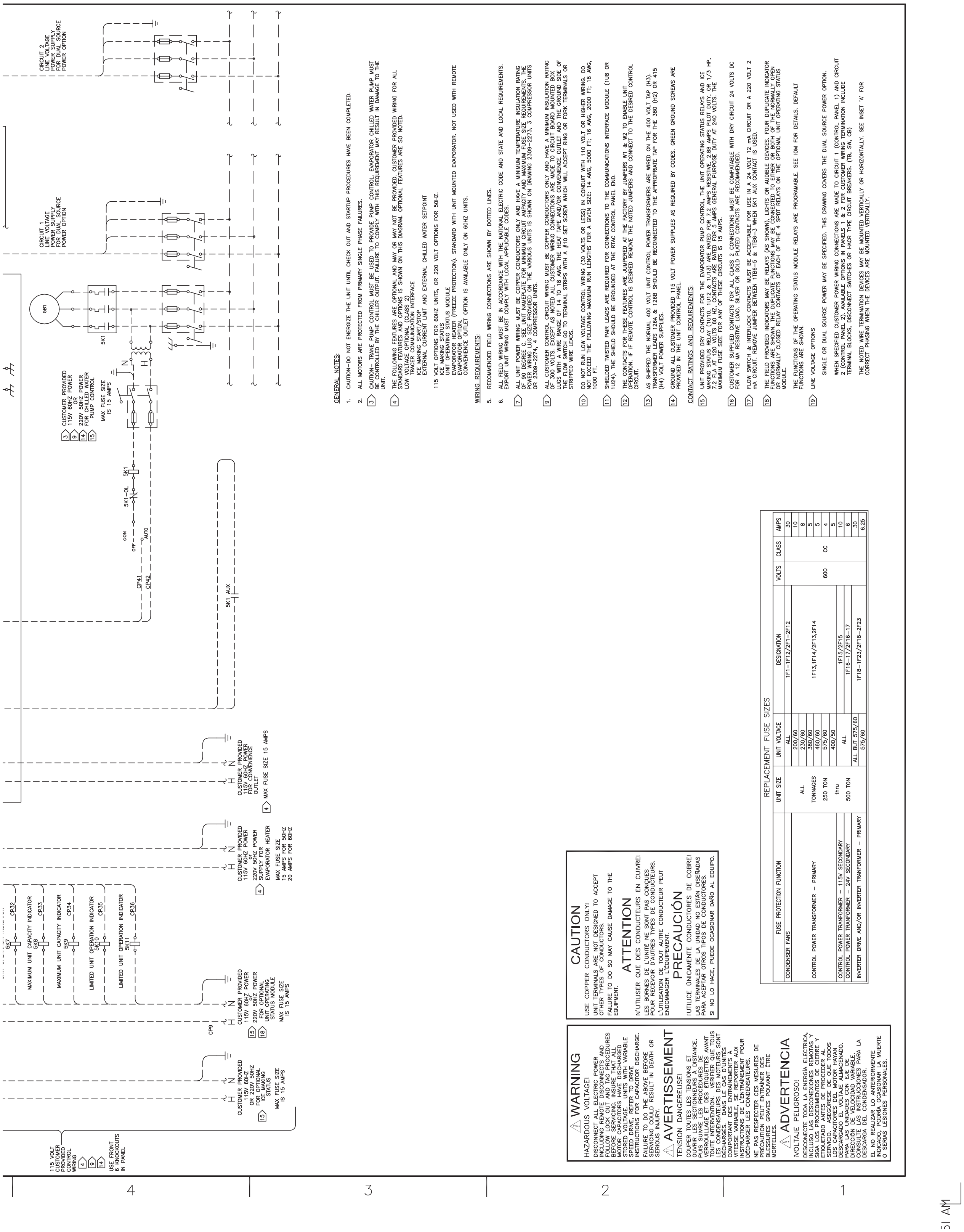
	SINGLE SOURCE POWER ELECTRICAL CIRCUIT 1 & 2		ELECTRICAL CIRCUIT 1 DUAL SOURCE POWER		ELECTRICAL CIRCUIT 2 DUAL SOURCE POWER	
VOLTAGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE
200/60/3	140 SE/HE/XE; 155 SE/HE;	THREE 1/0 AWG – 500 MCM	140 SE/HE/XE; 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155 SE/HE/XE; 170, 185, 200 SE/HE; 225 SE;	TWO 3/0 AWG – 500 MCM
	155XE, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	FOUR 250 MCM – 500 MCM	155, 170 XE; 225, 250 SE;	THREE 1/0 AWG – 500 MCM	170 XE, 250 SE;	THREE 1/0 AWG – 500 MCM
230/60/3	140, 155, 170 SE/HE/XE;	THREE 1/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225 SE;	TWO 3/0 AWG – 500 MCM
	185, 200 SE/HE; 225, 250 SE;	FOUR 250 MCM – 500 MCM	250 SE;	THREE 1/0 AWG – 500 MCM	250 SE;	THREE 1/0 AWG – 500 MCM
380/60/3	140, 155, 170 SE/HE/XE; 185 SE/HE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM
	200 SE/HE; 225, 250 SE;	THREE 1/0 AWG – 500 MCM				
460/60/3	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM
575/60/3	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 3/0 AWG – 500 MCM
400/50/3	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 3/0 AWG – 500 MCM

TERMINAL BLOCK OR LUG OPTION

	SINGLE SOURCE POWER ELECTRICAL CIRCUIT 1 & 2		ELECTRICAL CIRCUIT 1 DUAL SOURCE POWER		ELECTRICAL CIRCUIT 2 DUAL SOURCE POWER	
VOLTAGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE	UNIT SIZE (TONS) EFFICIENCY SE, HE & XE	LUG WIRE SIZE RANGE
200/60/3	140 SE/HE;	THREE 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170, 185, 200 SE/HE; 225 SE;	TWO 2 AWG – 600 MCM
	140XE; 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	FOUR 2 AWG – 600 MCM	140, 155, 170XE; 225, 250 SE;	THREE 2 AWG – 600 MCM	140, 155, 170 XE; 250 SE;	THREE 2 AWG – 600 MCM
230/60/3	140, 155 SE/HE;	THREE 2 AWG – 600 MCM	140 SE/HE/XE; 155, 170, 185, 200 SE/HE; 225 SE;	TWO 2 AWG – 600 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225 SE;	TWO 2 AWG – 600 MCM
	140, 155 XE; 170 SE/HE/XE; 185, 200 SE/HE; 225, 250SE;	FOUR 2 AWG – 600 MCM	155, 170XE; 250 SE;	THREE 2 AWG – 600 MCM	250 SE;	THREE 2 AWG – 600 MCM
380/60/3	140, 155, 170 SE/HE/XE; 185 SE/HE;	TWO 2 AWG – 600 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM
	200 SE/HE; 225, 250 SE;	THREE 2 AWG – 600 MCM				
460/60/3	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM
575/60/3	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM	140, 155, 170 SE/HE/XE; 185, 200 SE/HE; 225, 250 SE;	TWO 2 AWG – 600 MCM
400/50/3	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM	120, 130 HE; 140, 155, 170, 185, 200 SE/HE;	TWO 2 AWG – 600 MCM

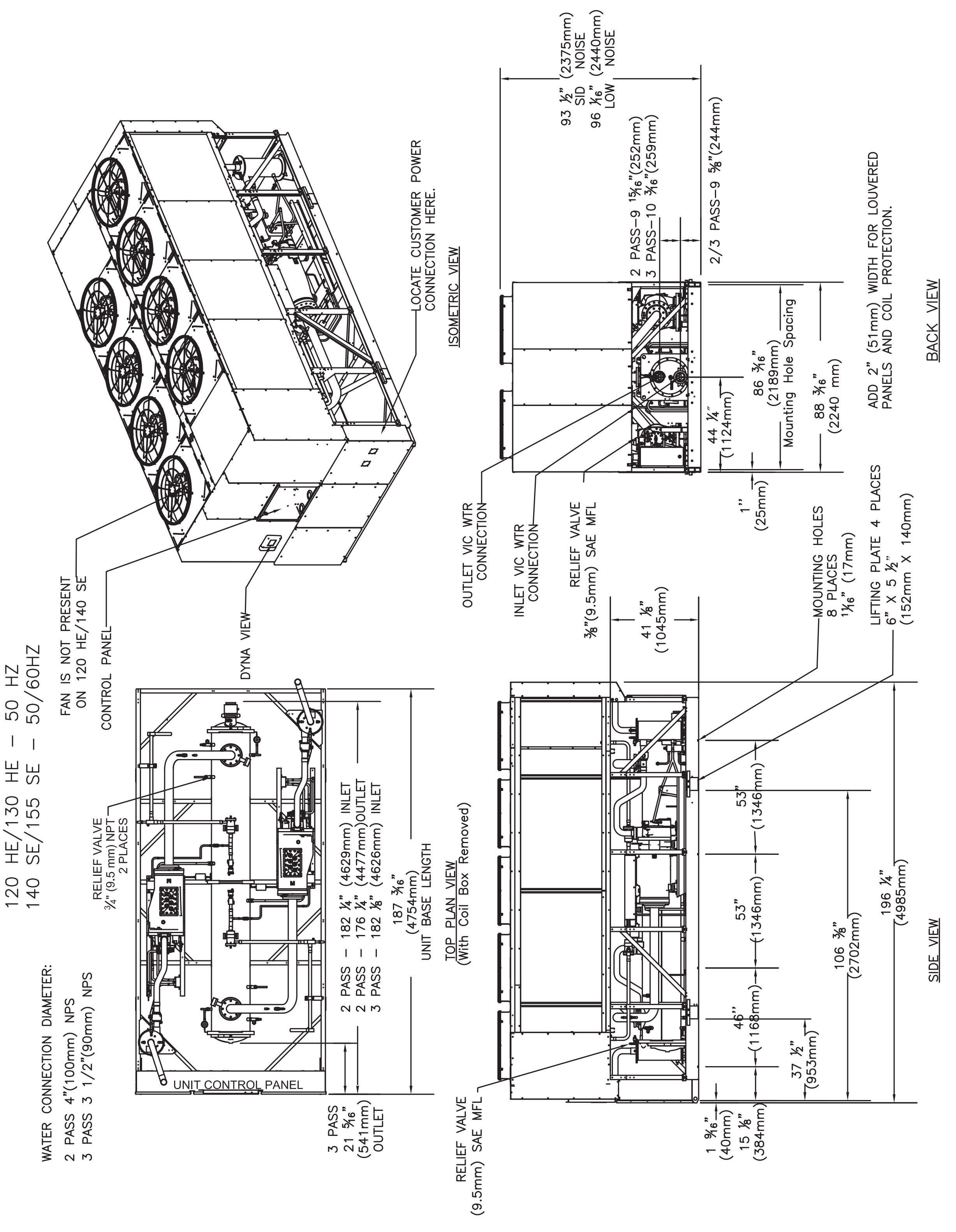
SE = STANDARD EFFICIENCY UNITS / HE = HIGH EFFICIENCY UNITS / XE = EXTRA EFFICIENCY UNITS



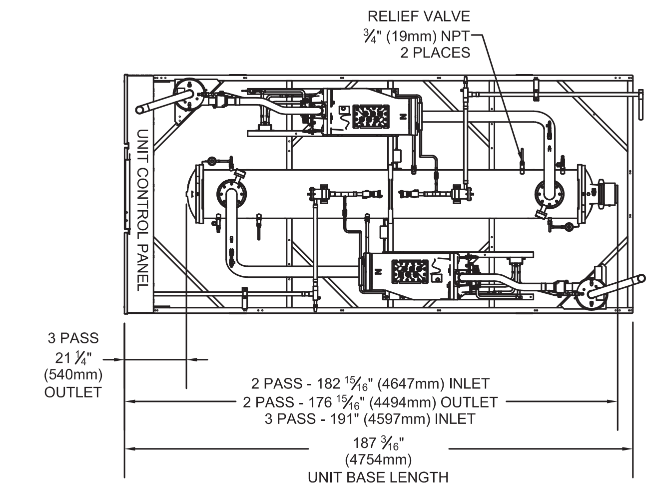


Dimensions

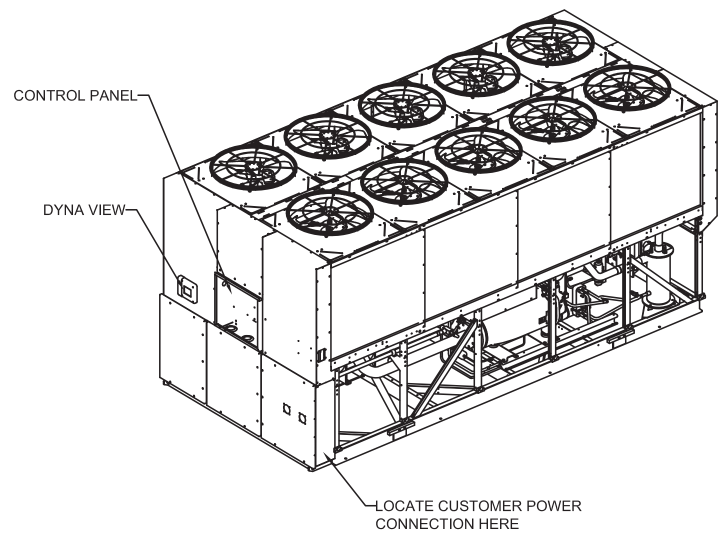
Note: *Mounting location dimensions may vary on units with seismic rating. See unit submittals..*



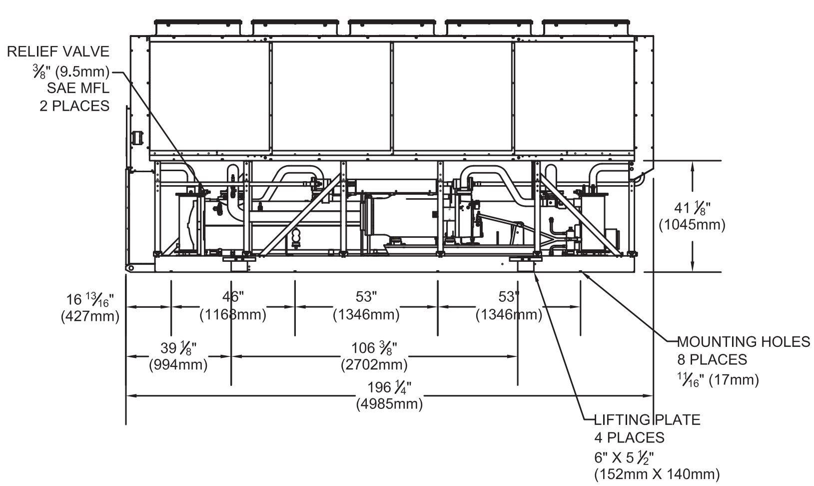
140 HE/170SE - 50 / 60HZ



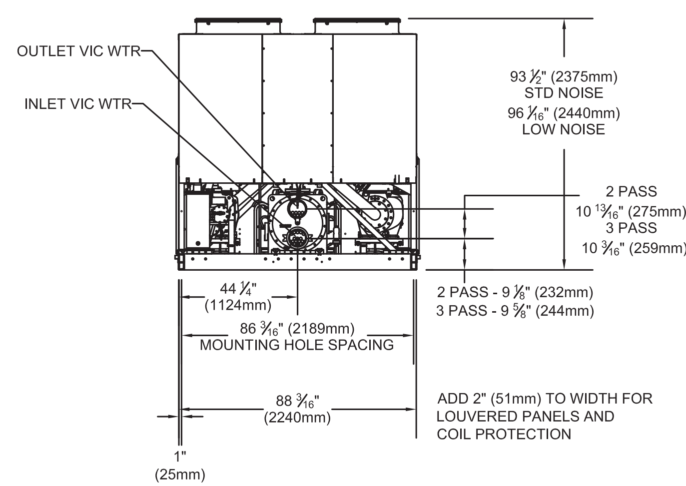
TOP PLAN VIEW
(WITH COIL BOX REMOVED)



ISOMETRIC VIEW

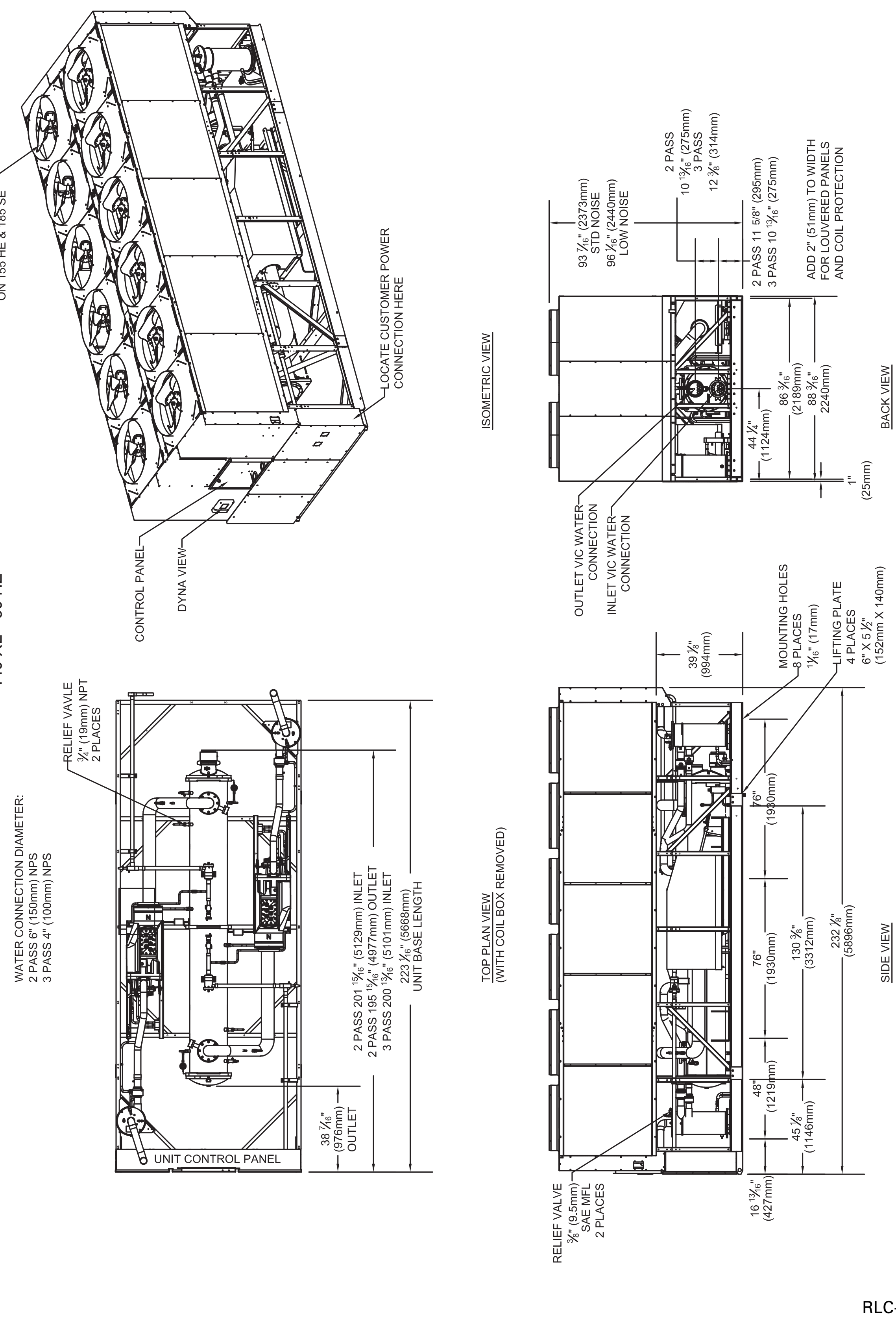


SIDE VIEW

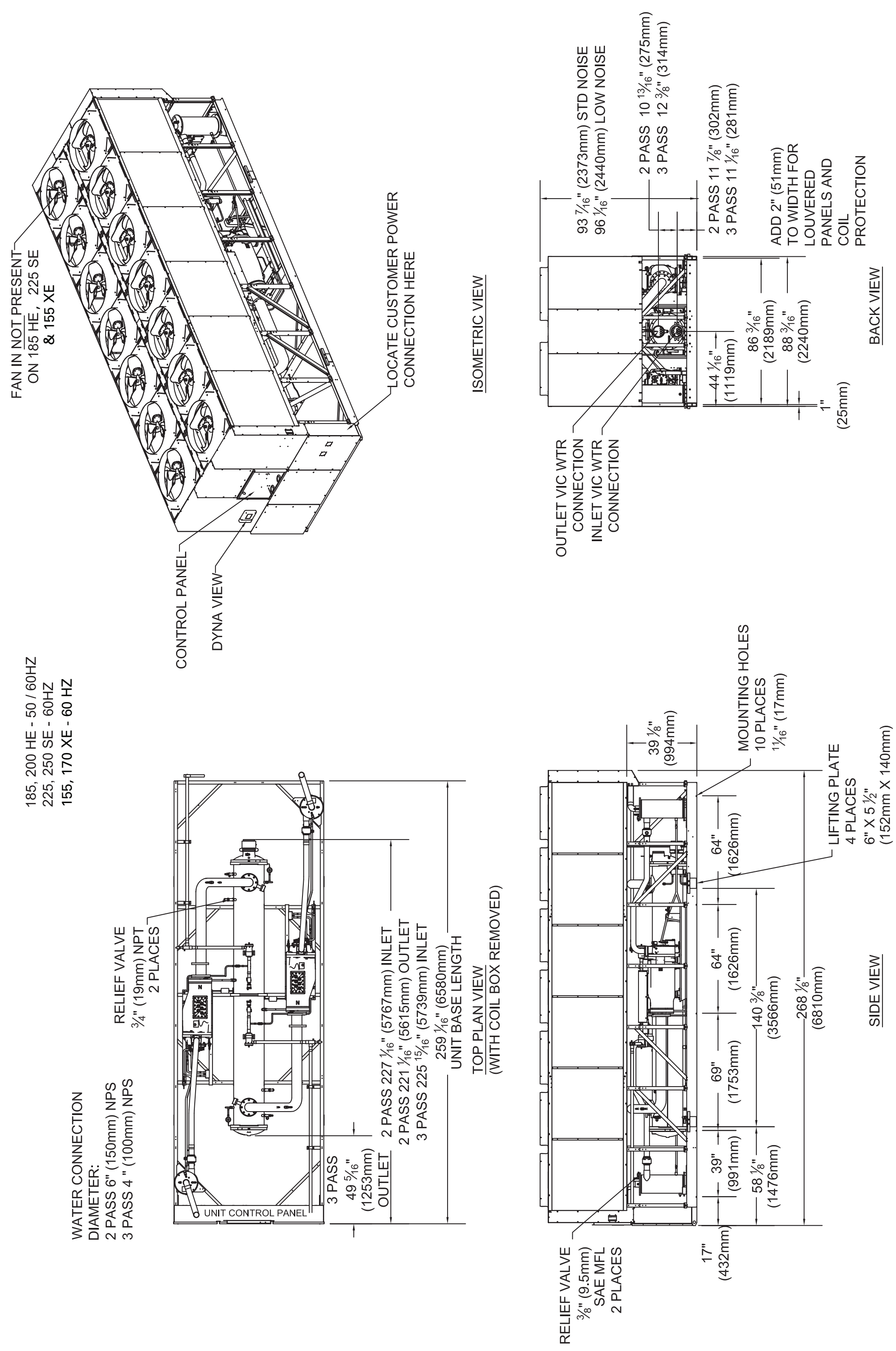


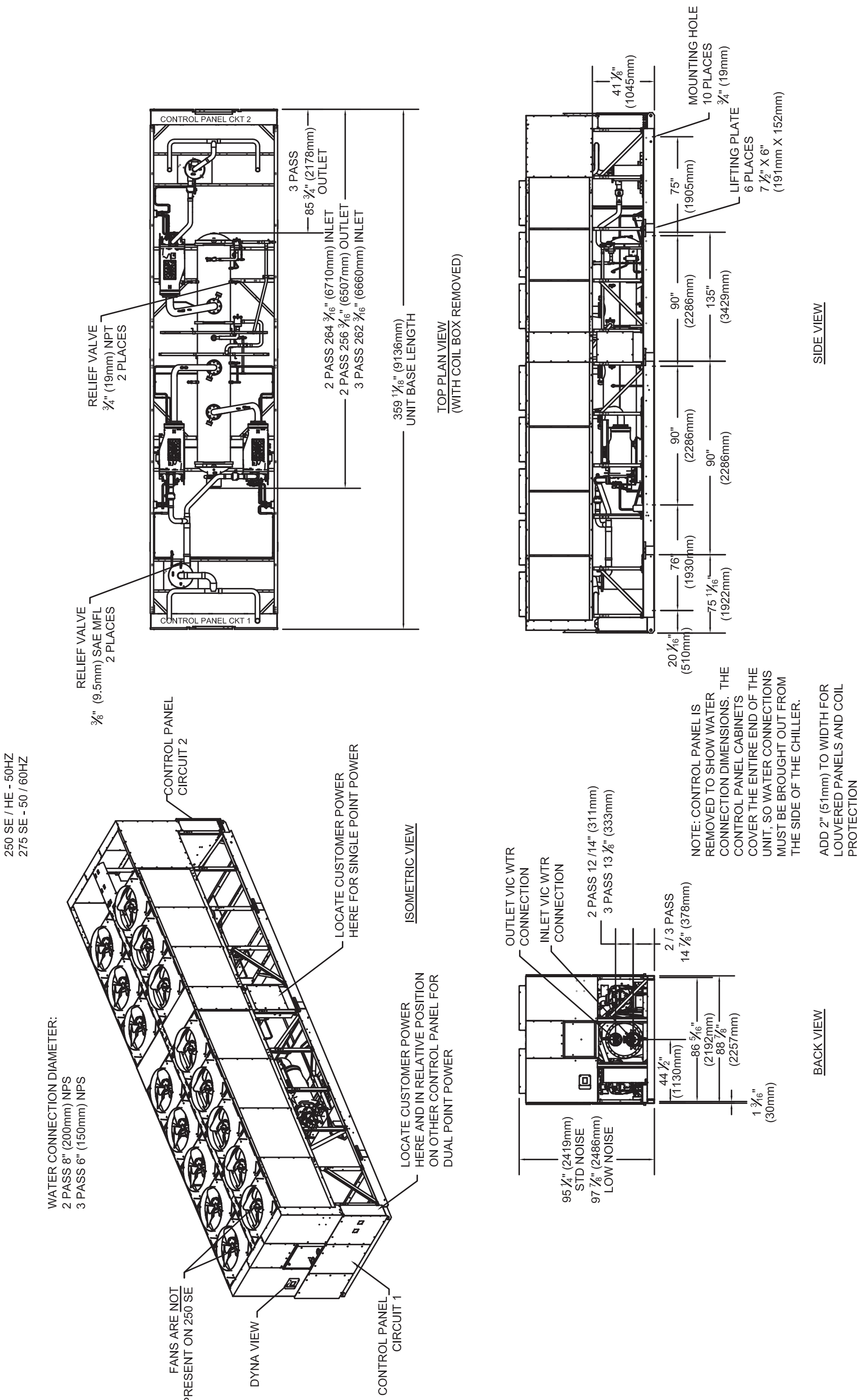
BACK VIEW

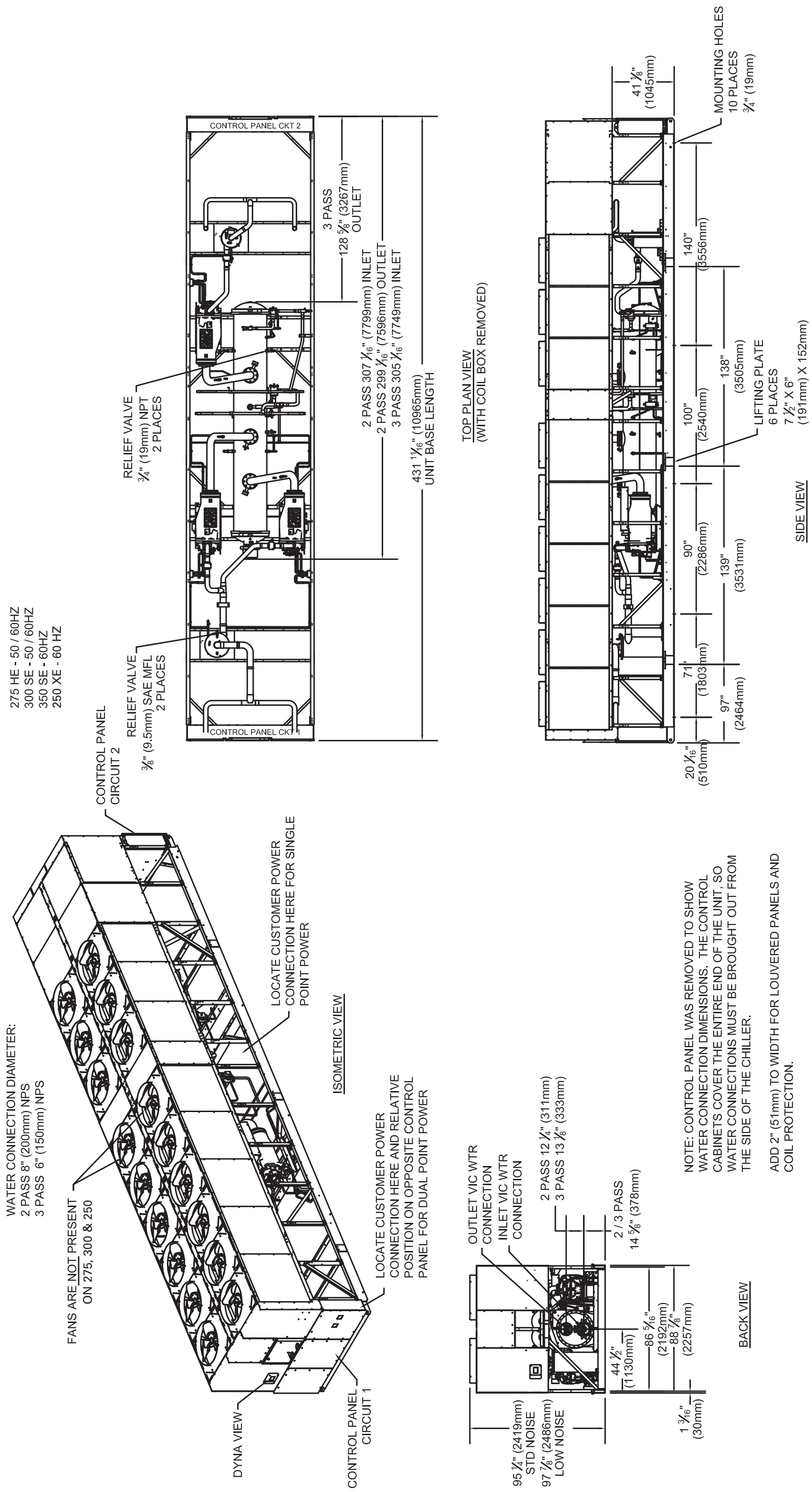
Dimensions



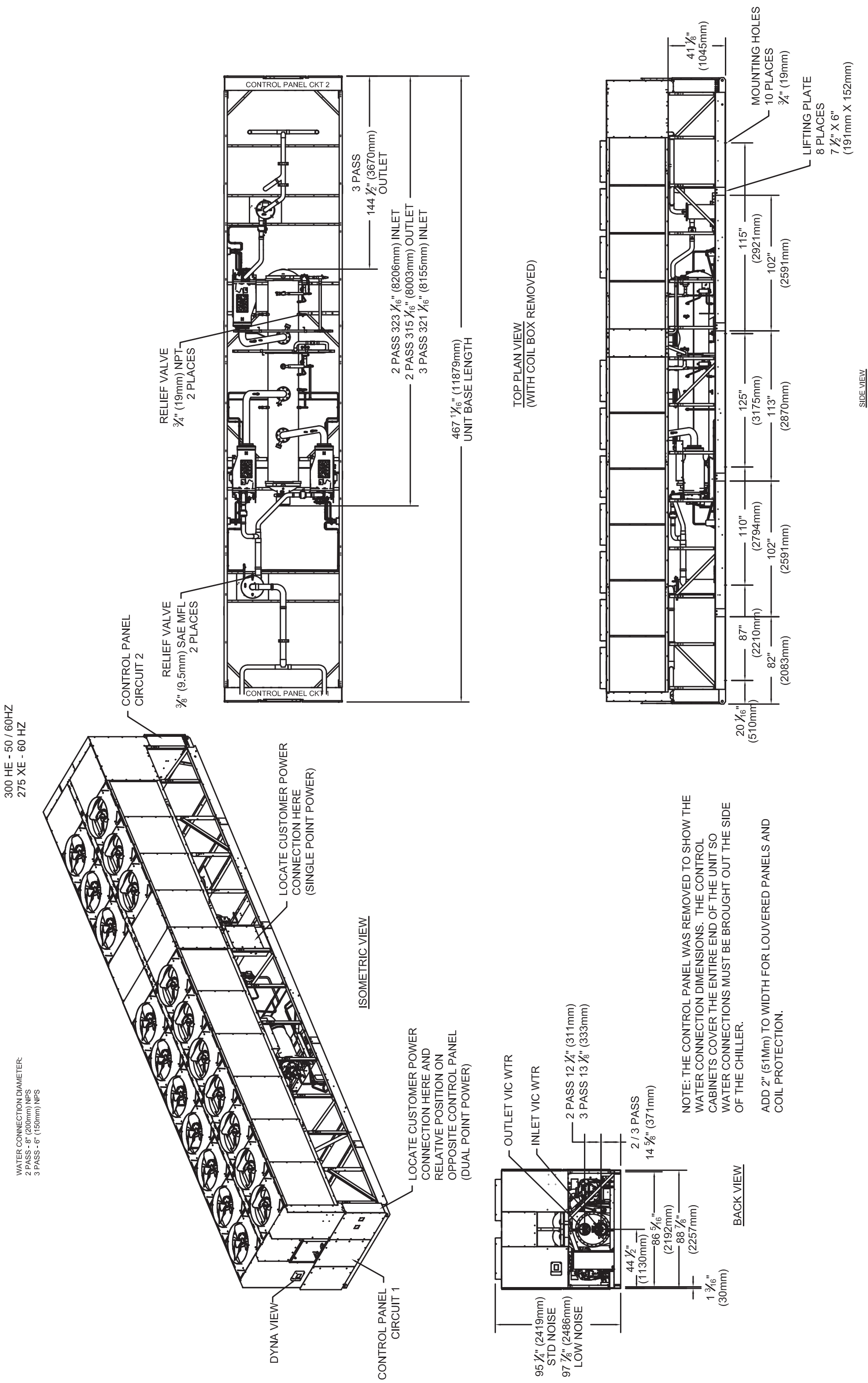
155, 170 HE/185, 200 SE - 50 / 60HZ
140 XE - 60 HZ
FAN IS NOT PRESENT ON 155 HE & 185 SE
LOCATE CUSTOMER POWER CONNECTION HERE
CONTROL PANEL
DYNA VIEW
ISOMETRIC VIEW
WATER CONNECTION DIAMETER:
2 PASS 6" (150mm) NPS
3 PASS 4" (100mm) NPS
RELIEF VAVLE
3/4" (19mm) NPT
2 PLACES
2 PASS 201 15/16" (5129mm) INLET
2 PASS 195 15/16" (4977mm) OUTLET
3 PASS 200 13/16" (5101mm) INLET
223 1/16" (5668mm)
UNIT BASE LENGTH
38 7/16" (976mm) OUTLET
UNIT CONTROL PANEL
TOP PLAN VIEW
(WITH COIL BOX REMOVED)
93 7/16" (2373mm) STD NOISE
96 1/16" (2440mm) LOW NOISE
2 PASS 10 13/16" (275mm)
3 PASS 12 3/8" (314mm)
2 PASS 11 5/8" (295mm)
3 PASS 10 13/16" (275mm)
ADD 2" (51mm) TO WIDTH FOR LOUVERED PANELS AND COIL PROTECTION
OUTLET VIC WATER CONNECTION
INLET VIC WATER CONNECTION
44 1/4" (1124mm)
86 3/16" (2189mm)
88 3/16" 2240mm)
1" (25mm)
BACK VIEW
39 1/8" (994mm)
MOUNTING HOLES
8 PLACES
11/16" (17mm)
LIFTING PLATE
4 PLACES
6" X 5 1/2"
(152mm X 140mm)
76" (1930mm)
76" (1930mm)
130 3/8" (3312mm)
232 1/8" (5896mm)
48" (1219mm)
45 1/8" (1146mm)
16 13/16" (427mm)
RELIEF VALVE
3/8" (9.5mm) SAE MFL
2 PLACES
SIDE VIEW

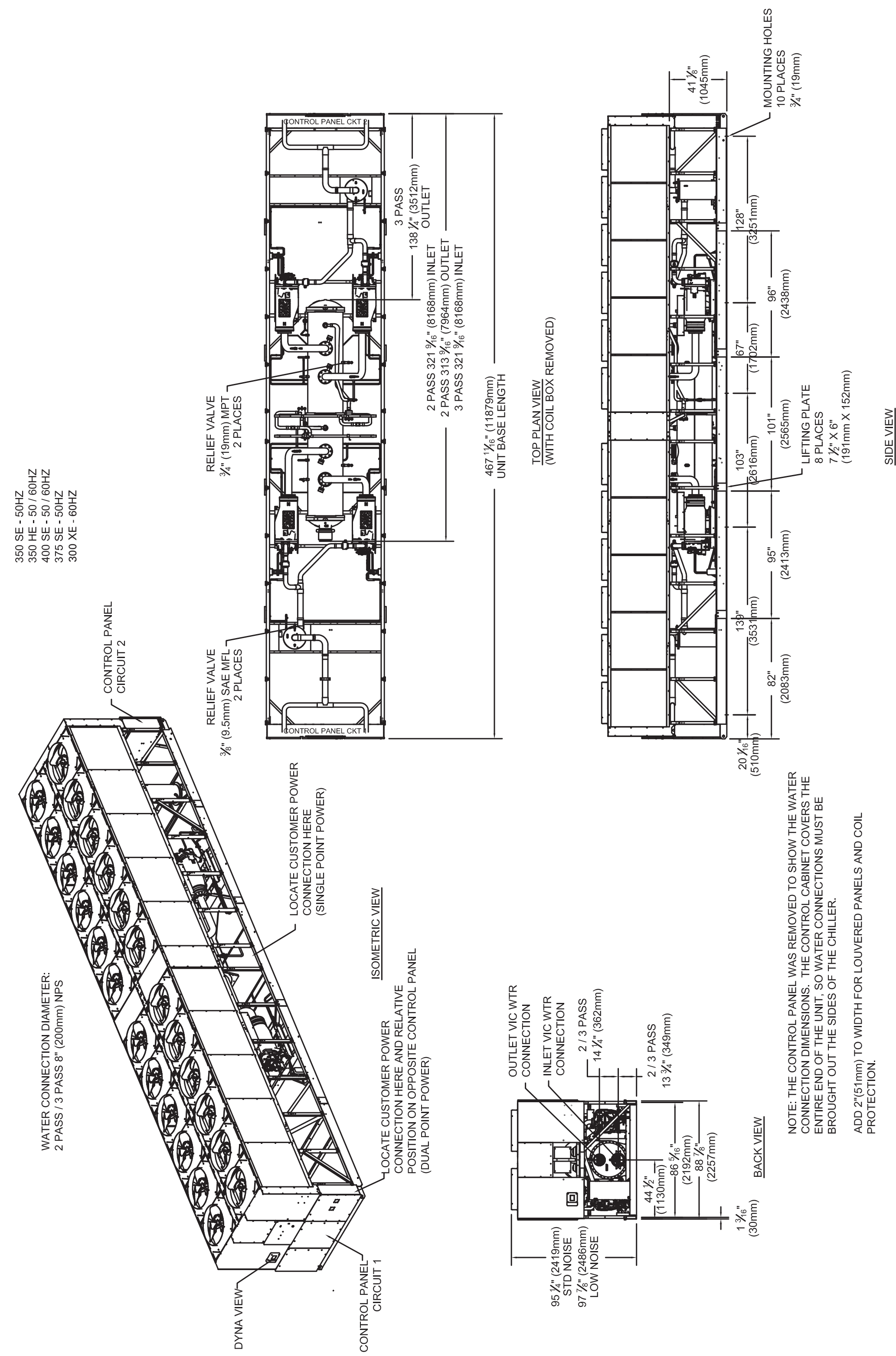

FAN IN NOT PRESENT ON 185 HE, 225 SE & 155 XE
LOCATE CUSTOMER POWER CONNECTION HERE
CONTROL PANEL
DYNA VIEW
ISOMETRIC VIEW
185, 200 HE - 50 / 60HZ
225, 250 SE - 60HZ
155, 170 XE - 60 HZ
93 7/16" (2373mm) STD NOISE
96 1/16" (2440mm) LOW NOISE
2 PASS 10 13/16" (275mm)
3 PASS 12 3/8" (314mm)
2 PASS 11 7/8" (302mm)
3 PASS 11 1/16" (281mm)
ADD 2" (51mm) TO WIDTH FOR LOUVERED PANELS AND COIL PROTECTION
44 1/16" (1119mm)
86 3/16" (2189mm)
88 3/16" (2240mm)
1" (25mm)
OUTLET VIC WTR CONNECTION
INLET VIC WTR CONNECTION
BACK VIEW
WATER CONNECTION DIAMETER:
2 PASS 6" (150mm) NPS
3 PASS 4" (100mm) NPS
RELIEF VALVE 3/4" (19mm) NPT 2 PLACES
3 PASS 49 5/16" (1253mm) OUTLET
2 PASS 227 1/16" (5767mm) INLET
2 PASS 221 1/16" (5615mm) OUTLET
3 PASS 225 15/16" (5739mm) INLET
259 1/16" (6580mm) UNIT BASE LENGTH
UNIT CONTROL PANEL
TOP PLAN VIEW (WITH COIL BOX REMOVED)
39 1/8" (994mm)
MOUNTING HOLES 10 PLACES 11/16" (17mm)
LIFTING PLATE 4 PLACES 6" X 5 1/2" (152mm X 140mm)
64" (1626mm)
64" (1626mm)
69" (1753mm)
39" (991mm)
140 3/8" (3566mm)
58 1/8" (1476mm)
268 1/8" (6810mm)
17" (432mm)
RELIEF VALVE 3/8" (9.5mm) SAE MFL 2 PLACES
SIDE VIEW


250 SE / HE - 50HZ
275 SE - 50 / 60HZ
WATER CONNECTION DIAMETER:
2 PASS 8" (200mm) NPS
3 PASS 6" (150mm) NPS
FANS ARE NOT PRESENT ON 250 SE
DYNA VIEW
CONTROL PANEL CIRCUIT 1
CONTROL PANEL CIRCUIT 2
LOCATE CUSTOMER POWER HERE FOR SINGLE POINT POWER
LOCATE CUSTOMER POWER HERE AND IN RELATIVE POSITION ON OTHER CONTROL PANEL FOR DUAL POINT POWER
ISOMETRIC VIEW
RELIEF VALVE
3⁄8" (9.5mm) SAE MFL
2 PLACES
RELIEF VALVE
3⁄4" (19mm) NPT
2 PLACES
CONTROL PANEL CKT 1
CONTROL PANEL CKT 2
3 PASS
85 3⁄4" (2178mm)
OUTLET
2 PASS 264 3⁄16" (6710mm) INLET
2 PASS 256 3⁄16" (6507mm) OUTLET
3 PASS 262 3⁄16" (6660mm) INLET
359 11⁄16" (9136mm)
UNIT BASE LENGTH
TOP PLAN VIEW
(WITH COIL BOX REMOVED)
41 1⁄8"
(1045mm)
MOUNTING HOLE
10 PLACES
3⁄4" (19mm)
LIFTING PLATE
6 PLACES
7 1⁄2" X 6"
(191mm X 152mm)
75"
(1905mm)
90"
(2286mm)
135"
(3429mm)
90"
(2286mm)
90"
(2286mm)
76"
(1930mm)
75 11⁄16"
(1922mm)
20 1⁄16"
(510mm)
SIDE VIEW
OUTLET VIC WTR CONNECTION
INLET VIC WTR CONNECTION
2 PASS 12 1/4" (311mm)
3 PASS 13 1⁄8" (333mm)
2 / 3 PASS
14 7⁄8" (378mm)
95 1⁄4" (2419mm)
STD NOISE
97 7⁄8" (2486mm)
LOW NOISE
44 1⁄2"
(1130mm)
86 5⁄16"
(2192mm)
88 7⁄8"
(2257mm)
1 3⁄16"
(30mm)
BACK VIEW
NOTE: CONTROL PANEL IS REMOVED TO SHOW WATER CONNECTION DIMENSIONS. THE CONTROL PANEL CABINETS COVER THE ENTIRE END OF THE UNIT, SO WATER CONNECTIONS MUST BE BROUGHT OUT FROM THE SIDE OF THE CHILLER.
ADD 2" (51mm) TO WIDTH FOR LOUVERED PANELS AND COIL PROTECTION


WATER CONNECTION DIAMETER:
2 PASS 8" (200mm) NPS
3 PASS 6" (150mm) NPS
FANS ARE NOT PRESENT ON 275, 300 & 250
DYNA VIEW
CONTROL PANEL CIRCUIT 1
CONTROL PANEL CIRCUIT 2
LOCATE CUSTOMER POWER CONNECTION HERE FOR SINGLE POINT POWER
LOCATE CUSTOMER POWER CONNECTION HERE AND RELATIVE POSITION ON OPPOSITE CONTROL PANEL FOR DUAL POINT POWER
ISOMETRIC VIEW
275 HE - 50 / 60HZ
300 SE - 50 / 60HZ
350 SE - 60HZ
250 XE - 60 HZ
RELIEF VALVE 3⁄8" (9.5mm) SAE MFL 2 PLACES
RELIEF VALVE 3⁄4" (19mm) NPT 2 PLACES
CONTROL PANEL CKT 1
CONTROL PANEL CKT 2
3 PASS 128 5⁄8" (3267mm) OUTLET
2 PASS 307 1⁄16" (7799mm) INLET
2 PASS 299 1⁄16" (7596mm) OUTLET
3 PASS 305 1⁄16" (7749mm) INLET
431 11⁄16" (10965mm) UNIT BASE LENGTH
TOP PLAN VIEW (WITH COIL BOX REMOVED)
OUTLET VIC WTR CONNECTION
INLET VIC WTR CONNECTION
2 PASS 12 1⁄4" (311mm)
3 PASS 13 1⁄8" (333mm)
2 / 3 PASS 14 5⁄8" (378mm)
95 1⁄4" (2419mm) STD NOISE
97 7⁄8" (2486mm) LOW NOISE
44 1⁄2" (1130mm)
86 5⁄16" (2192mm)
88 7⁄8" (2257mm)
1 3⁄16" (30mm)
BACK VIEW
NOTE: CONTROL PANEL WAS REMOVED TO SHOW WATER CONNECTION DIMENSIONS. THE CONTROL CABINETS COVER THE ENTIRE END OF THE UNIT, SO WATER CONNECTIONS MUST BE BROUGHT OUT FROM THE SIDE OF THE CHILLER.
ADD 2" (51mm) TO WIDTH FOR LOUVERED PANELS AND COIL PROTECTION.
20 1⁄16" (510mm)
97" (2464mm)
71" (1803mm)
139" (3531mm)
90" (2286mm)
100" (2540mm)
138" (3505mm)
140" (3556mm)
41 1⁄8" (1045mm)
MOUNTING HOLES 10 PLACES 3⁄4" (19mm)
LIFTING PLATE 6 PLACES 7 1⁄2" X 6" (191mm) X 152mm)
SIDE VIEW

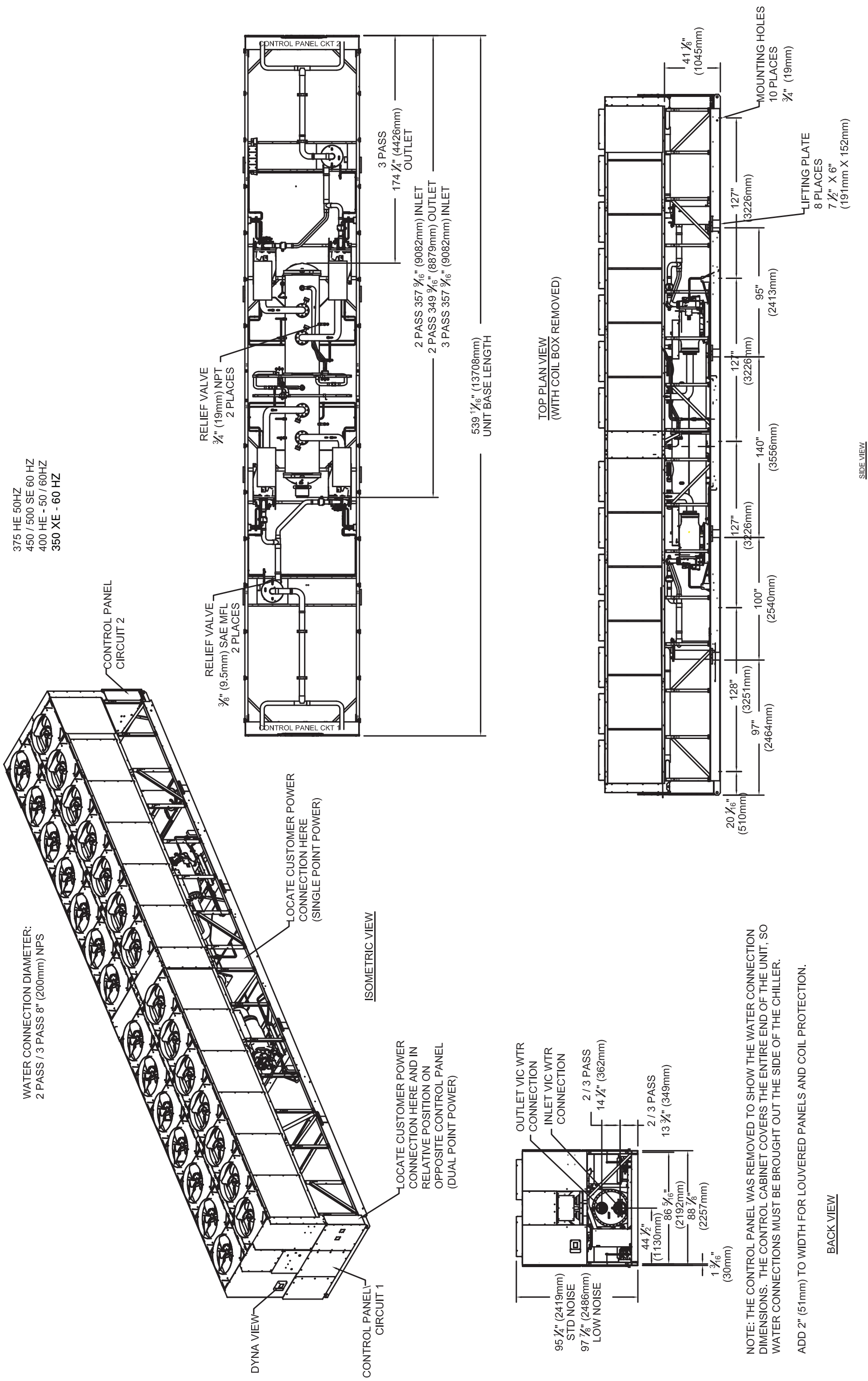
Dimensions


300 HE - 50 / 60HZ
275 XE - 60 HZ
WATER CONNECTION DIAMETER:
2 PASS - 8" (200mm) NPS
3 PASS - 6" (150mm) NPS
CONTROL PANEL CKT 2
CONTROL PANEL CKT
3 PASS
144 1/2" (3670mm)
OUTLET
2 PASS 323 1/16" (8206mm) INLET
2 PASS 315 1/16" (8003mm) OUTLET
3 PASS 321 1/8" (8155mm) INLET
467 11/16" (11879mm)
UNIT BASE LENGTH
RELIEF VALVE
3/4" (19mm) NPT
2 PLACES
RELIEF VALVE
3/8" (9.5mm) SAE MFL
2 PLACES
CONTROL PANEL
CIRCUIT 2
TOP PLAN VIEW
(WITH COIL BOX REMOVED)
41 1/8"
(1045mm)
MOUNTING HOLES
10 PLACES
3/4" (19mm)
LIFTING PLATE
8 PLACES
7 1/2" X 6"
(191mm X 152mm)
115"
(2921mm)
102"
(2591mm)
125"
(3175mm)
113"
(2870mm)
110"
(2794mm)
102"
(2591mm)
87"
(2210mm)
82"
(2083mm)
20 1/16"
(510mm)
SIDE VIEW
LOCATE CUSTOMER POWER
CONNECTION HERE
(SINGLE POINT POWER)
ISOMETRIC VIEW
LOCATE CUSTOMER POWER
CONNECTION HERE AND
RELATIVE POSITION ON
OPPOSITE CONTROL PANEL
(DUAL POINT POWER)
DYNA VIEW
CONTROL PANEL
CIRCUIT 1
OUTLET VIC WTR
INLET VIC WTR
2 PASS 12 1/4" (311mm)
3 PASS 13 1/8" (333mm)
2 / 3 PASS
14 5/8" (371mm)
44 1/2"
(1130mm)
86 5/16"
(2192mm)
88 7/8"
(2257mm)
1 3/16"
(30mm)
95 1/4" (2419mm)
STD NOISE
97 7/8" (2486mm)
LOW NOISE
BACK VIEW
NOTE: THE CONTROL PANEL WAS REMOVED TO SHOW THE
WATER CONNECTION DIMENSIONS. THE CONTROL
CABINETS COVER THE ENTIRE END OF THE UNIT SO
WATER CONNECTIONS MUST BE BROUGHT OUT THE SIDE
OF THE CHILLER.
ADD 2" (51Mm) TO WIDTH FOR LOUVERED PANELS AND
COIL PROTECTION.



350 SE - 50HZ
350 HE - 50 / 60HZ
400 SE - 50 / 60HZ
375 SE - 50HZ
300 XE - 60HZ
WATER CONNECTION DIAMETER:
2 PASS / 3 PASS 8" (200mm) NPS
CONTROL PANEL
CIRCUIT 2
RELIEF VALVE
3⁄8" (9.5mm) SAE MFL
2 PLACES
RELIEF VALVE
3⁄4" (19mm) MPT
2 PLACES
CONTROL PANEL CKT
3 PASS
138 1⁄4" (3512mm)
OUTLET
2 PASS 321 9⁄16" (8168mm) INLET
2 PASS 313 9⁄16" (7964mm) OUTLET
3 PASS 321 9⁄16" (8168mm) INLET
467 11⁄16" (11879mm)
UNIT BASE LENGTH
TOP PLAN VIEW
(WITH COIL BOX REMOVED)
LOCATE CUSTOMER POWER
CONNECTION HERE
(SINGLE POINT POWER)
ISOMETRIC VIEW
LOCATE CUSTOMER POWER
CONNECTION HERE AND RELATIVE
POSITION ON OPPOSITE CONTROL PANEL
(DUAL POINT POWER)
DYNA VIEW
CONTROL PANEL
CIRCUIT 1
41 1⁄8"
(1045mm)
MOUNTING HOLES
10 PLACES
3⁄4" (19mm)
128"
(3251mm)
96"
(2438mm)
67"
(1702mm)
101"
(2565mm)
103"
(2616mm)
95"
(2413mm)
139"
(3531mm)
82"
(2083mm)
20 1⁄16"
(510mm)
LIFTING PLATE
8 PLACES
7 1⁄2" X 6"
(191mm X 152mm)
SIDE VIEW
OUTLET VIC WTR
CONNECTION
INLET VIC WTR
CONNECTION
2 / 3 PASS
14 1⁄4" (362mm)
2 / 3 PASS
13 3⁄4" (349mm)
95 1⁄4" (2419mm)
STD NOISE
97 7⁄8" (2486mm)
LOW NOISE
44 1⁄2"
(1130mm)
86 5⁄16"
(2192mm)
88 7⁄8"
(2257mm)
1 3⁄16"
(30mm)
BACK VIEW
NOTE: THE CONTROL PANEL WAS REMOVED TO SHOW THE WATER CONNECTION DIMENSIONS. THE CONTROL CABINET COVERS THE ENTIRE END OF THE UNIT, SO WATER CONNECTIONS MUST BE BROUGHT OUT THE SIDES OF THE CHILLER.
ADD 2"(51mm) TO WIDTH FOR LOUVERED PANELS AND COIL PROTECTION.

Dimensions



NOTE: THE CONTROL PANEL WAS REMOVED TO SHOW THE WATER CONNECTION DIMENSIONS. THE CONTROL CABINET COVERS THE ENTIRE END OF THE UNIT, SO WATER CONNECTIONS MUST BE BROUGHT OUT THE SIDE OF THE CHILLER.

ADD 2" (51mm) TO WIDTH FOR LOUVERED PANELS AND COIL PROTECTION.

Weights

Table 15. Weight - packaged units - 50 Hz - aluminum or CompleteCoat coils

Unit Size (tons)	Standard Efficiency				High Efficiency			
	Shipping		Operating		Shipping		Operating	
	lb	kg	lb	kg	lb	kg	lb	kg
120	n/a				10832	4913	11146	5056
130	n/a				10910	4949	11146	5056
140	10844	4919	11146	5056	10871	4931	11160	5062
155	11131	5049	11397	5170	12466	5654	12786	5800
170	11426	5183	11632	5276	12742	5780	12990	5892
185	12797	5805	13111	5947	14383	6524	14754	6692
200	12962	5879	13304	6035	14516	6584	14967	6789
250	18051	8188	19186	8703	19176	8698	20483	9291
275	19715	8943	20240	9181	21944	9954	21532	9767
300	20242	9182	21027	9538	22272	10102	22185	10063
350	23231	10537	23799	10795	24924	11305	25812	11708
375	24360	11049	25213	11436	26298	11929	26963	12230
400	25222	11440	25854	11727	27120	12301	27751	12588

1. Operating weight includes refrigerant and water.
2. Shipping weight includes refrigerant.
3. All weights +/- 3%.

Table 16. Weight - packaged units - 50 Hz - copper coils

Unit Size (tons)	Standard Efficiency				High Efficiency			
	Shipping		Operating		Shipping		Operating	
	lb	kg	lb	kg	lb	kg	lb	kg
120	n/a				13407	6081	13734	6230
130	n/a				13426	6090	13734	6230
140	13417	6086	13734	6230	13446	6099	13734	6230
155	13851	6283	13962	6333	15772	7154	16192	7345
170	13856	6285	14366	6516	16162	7331	17421	7902
185	16216	7355	16463	7467	18570	8423	18979	8609
200	16381	7430	16721	7584	18833	8542	19223	8719
250	22058	10005	21837	9905	24015	10893	24056	10912
275	24584	11151	25095	11383	26617	12073	27135	12308
300	25893	11745	26336	11946	27617	12527	28182	12783
350	29084	13192	29527	13393	32037	14532	32712	14838
375	30432	13804	30971	14048	32463	14725	32971	14955
400	32112	14566	32787	14872	34982	15867	35525	16114

1. Operating weight includes refrigerant and water.
2. Shipping weight includes refrigerant.
3. All weights +/- 3%.

Mechanical Specifications

General

Units are leak and pressure tested at 390 psig high side, 250 psig low side, then evacuated and charged. All Air-Cooled Series R Chillers are factory tested prior to shipment. Packaged units ship with a full operating charge of oil and refrigerant. Unit panels, structural elements and control boxes are constructed of galvanized steel and mounted on a welded structural steel base. Unit panels and control boxes are finished with a baked on powder paint, and the structural base with an air dry paint. All paint meets the requirement for outdoor equipment of the US Navy and other federal government agencies.

Evaporator

The evaporator is a tube-in-shell heat exchanger design with internally and externally finned copper tubes roller expanded into the tube sheet. The evaporator is designed, tested and stamped in accordance with ASME for a refrigerant side working pressure of 200 psig. The evaporator is designed for a water side working pressure of 150 psig. Water connections are grooved pipe. Each shell includes a vent, a drain and fittings for temperature control sensors and is insulated with 3/4 inch equal insulation (K=0.28). Evaporator heaters with thermostat are provided to help protect the evaporator from freezing at ambient temperatures down to -20°F (-29°C). Factory installed flow switch is installed on a pipe stub in the evaporator inlet.

Condenser and Fans

Air-cooled condenser coils have aluminum fins mechanically bonded to internally finned seamless copper tubing. The condenser coil has an integral subcooling circuit. Condensers are factory proof and leak tested at 506 psig. Direct drive vertical discharge condenser fans are dynamically balanced. Totally enclosed air over motors completely seal the motor windings to prevent exposure to ambient conditions. Three-phase condenser fan motors with permanently lubricated ball bearings and internal thermal overload protection are provided. Standard units will start and operate between 25 to 115°F (-4 to 46°C) ambient.

Compressor and Lube Oil System

The rotary screw compressor is semi-hermetic, direct drive, 3000 rpm, 50 Hz, with capacity control slide valve, a load/unload valve, rolling element bearings, differential refrigerant pressure oil pump and oil heater. The motor is a suction gas cooled, hermetically sealed, two-pole squirrel cage induction motor. Oil separator and filtration devices are provided separate from the compressor. Check valves in the compressor discharge and lube oil system and a solenoid valve in the lube system are also provided.

Refrigeration Circuits

Each unit has two refrigerant circuits, with one or two rotary screw compressors per circuit. Each refrigerant circuit includes a compressor suction and discharge service valve, liquid line shutoff valve, removable core filter, liquid line sight glass with moisture indicator, charging port and an electronic expansion valve. Fully modulating compressors and electronic expansion valves provide variable capacity modulation over the entire operating range.

Unit Controls

All unit controls are housed in an outdoor rated weather tight enclosure with removable plates to allow for customer connection of power wiring and remote interlocks. All controls, including sensors, are factory mounted and tested prior to shipment. Microcomputer controls provide all control functions including startup and shut down, leaving chilled water temperature control, evaporator flow proving, compressor and electronic expansion valve modulation, fan sequencing, anti-recycle logic, automatic lead/lag compressor starting and load limiting. The unit control module, utilizing Adaptive Control™ microprocessor, automatically takes action to avoid unit shutdown due to abnormal operating conditions associated with low refrigerant pressure, high condensing pressure and motor current overload. Should the abnormal operating condition continue until a protective limit is violated, the unit will be shut down. Unit protective functions

include loss of chilled water flow, evaporator freezing, loss of refrigerant, low refrigerant pressure, high refrigerant pressure, reverse rotation, compressor starting and running over current, phase loss, phase imbalance, phase reversal, and loss of oil flow. A digital display indicates chilled water setpoint and leaving chilled water temperature as standard. While current limit setpoint, evaporator and condenser refrigerant pressures, and electrical information are an option. Both standard and optional displays can be viewed on the unit without opening any control panel doors. Standard power connections include main three phase power to the compressors, condenser fans and control power transformer and optional connections are available for the 115 volt/60 Hz single phase power for freeze protection on the evaporator heaters.

Starters

Starters are housed in a weather tight enclosure with removable cover plate to allow for customer connection of power wiring. Across-the-line starters are standard on all 400/50 volt units. Wye Delta closed transition starters (33 percent of LRA inrush) are optional on 400/50 volt units. Typically, Trane helical rotary screw compressors are up to full speed in one second when started across-the-line and have equivalent inrush with similar size reciprocating compressor with part wind starters.

Chilled Water Reset

This provides the control logic and factory installed sensors to reset leaving chilled water temperature. The setpoint can be reset based on ambient temperature or return evaporator water temperature.

Flow Control

The factory installed flow switch is provided with the control logic and relays to turn the chilled water flow on and off as the chiller requires for operation and protection. This function is a requirement on the Air-Cooled Series R Chiller.

Options

Applications Options

High Efficiency/Performance Option

High efficiency option provides an increase in efficiency over standard efficiency by providing oversized heat exchangers for two purposes. One, it allows the unit to be more energy efficient. Two, the unit will have enhanced operation in high ambient conditions.

Extra Efficiency/Performance Option

Extra efficiency option (60 Hz only) provides an increase in efficiency over the high efficiency unit by providing oversized heat exchangers for two purposes. One, it allows the unit to be more energy efficient. Two, the unit will have enhanced operation in high ambient conditions.

Ice Making

The ice making option provides special control logic and oil coolers to handle low temperature brine applications (less than 40°F [4.4°C] leaving evaporator temperature) for thermal storage applications.

Low Temperature Brine

The low temperature option provides special control logic and oil coolers to handle low temperature brine applications (less than 40°F [4.4°C] leaving evaporator temperature).

Low Ambient Option

The low ambient option provides special control logic, oil coolers, and variable frequency drives on the condenser fan circuits to permit low temperature startup and operation down to 0°F (-18°C).

High Ambient Option

The high ambient option consists of special control logic and oil coolers to permit high ambient (up to 125°F [51°C]) operation. This option offers the best performance when coupled with the high efficiency performance option.

Electrical Options

Circuit Breaker

A HACR rated molded case capacity circuit breaker (UL approved) is available. The circuit breaker can also be used to disconnect the chiller from main power with a through the door handle and comes pre-wired from the factory with terminal block power connections. The external operator handle is lockable.

Non-Fused Power Disconnect Switch

The non-fused molded case disconnect switch (UL approved) is used to disconnect the chiller from main power and comes pre-wired from the factory with terminal block power connections. The external operator handle is lockable.

Single/Dual Incoming Power Line Connection

Single or dual points of termination are available for incoming power line connections*. Units with 3-4 compressors must order circuit breakers with the single point connection option. *Some restrictions may apply.

Wye-Delta Compressor Start Type

This option provides a reduced inrush starter. Wye-Delta starters are standard on 200-230 volt machines.

Control Options

BACnet Communications Interface

Allows the user to easily interface with BACnet via a single twisted pair wiring to a factory installed and tested communication board.

LonTalk (LCI-C) Communications Interface

Provides the LonMark chiller profile inputs/outputs for use with a generic building automation system.

Remote Input Options

Permits remote chilled liquid setpoint, remote current limit setpoint, or both by accepting a 4-20 mA or 2-10 Vdc analog signal.

Remote Output Options

Permits alarm relay outputs, ice making outputs, or both.

Tracer Summit Communication Interface

Permits bi-directional communication to the Tracer Summit system.

Other Options

Architectural Louvered Panels

Louvered panels cover the complete condensing coil and service area beneath the condenser.

Coil Protection

Louvered panels protect the condenser coils only.

Compressor Sound Enhancement

Factory installed weatherproof compressor enclosure to reduce compressor sound levels.

Condenser Corrosion Protection

Copper fins and CompleteCoat are available on all size units for corrosion protection. Job site conditions should be matched with the appropriate condenser fin materials to inhibit coil corrosion and ensure extended equipment life. The CompleteCoat option provides fully assembled coils with a flexible dip and bake epoxy coating.

Flange Kit

Provides a raised face flange kit that converts the grooved pipe evaporator water connections to flange connectors.

Insulation for High Humidity

The evaporator is covered with factory-installed 1.25 inch (31.8 mm) Armaflex II or equal (k=0.28) insulation. Foam insulation is used on the suction line.

Low Noise Fans

Complete fan assembly combining ultra quiet nine blade fans and TEAO fan motors to provide sound reductions with no performance degradation to the unit. The fan blades are heavy-duty molded plastic with wavy edges to reduce airflow turbulation.

Isolators - Neoprene

Isolators provide isolation between chiller and structure to help eliminate vibration transmission. Neoprene isolators are more effective and recommended over spring isolators.

Elastomeric Isolation Pads - Seismically Rated

Elastomeric isolation pads are designed and tested to control the motion of the chiller during a seismic event.

Isolators - Seismically Rated

Spring isolators are designed and tested to control the motion of the chiller during a seismic event.

Seismically Rated Unit - IBC & OSHPD

Unit is built and certified for seismic applications in accordance with OSHPD and the following International Building Code (IBC) releases: 2000, 2003, 2006 and 2009.

Performance Tests

Performance and witness tests are available, based on requested operating points, to certify chiller performance in accordance with AHRI Standard 550/590.

Rapid Restart Test

After completion of a standard full load witness test, power to the chiller will be cut and then reapplied to demonstrate the chiller's rapid restart capabilities for disaster relief.

Tarp

The unit will be covered at the factory with a PVC coated polyester tarp that is tied to the chiller base to help protect the chiller from debris during shipment especially in the winter months and on shipping vessels. This option may also be helpful if the chiller will be stored at the jobsite before use.

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Air-Cooled Chillers
AHRI Standard 550/590

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